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ABSTRACT

This proceedings of the IATUL 1999 conference of the contains the following papers: "From Industry to Higher Education and Libraries: Building the Fast Response Library" (A. S. Apostolou & C. H. Skiadas); "Managing the Learning Agenda in a Converged Service Environment" (Richard Biddiscombe); "Management of Electronic Information" (Michael Breaks); "Challenging Technolust: The Educational Responsibility of Librarians" (Alan Bundy); "Sharing Metadata: Enabling Online Information Provision" (Jenny Darzentas); "Breaking through with Thin-Client Technologies: A Cost Effective Approach for Academic Libraries" (Sohair W. Elbaz & Christofer Stewart); "The Future of the Academic Library and the Academic Librarian--A Delphi Study" (Blazej Feret & Marzena Marcinek); "Information Literacy Courses in Engineering and Science--The Design and Implementation of the DEDICATE Courses" (Nancy Fjallbrant & Philippa Levy); "New Reference: Diversifying Service Delivery" (Imogen Garner); "A Key to the New Library" (Egbert Gerryts & Heila Pienaar); "The Innovation in Everyday Life of Libraries" (Anthi Katsirikou); "The Library of the University of South Africa's Marketing: Voyage of Discovery through Conventional Marketing Channels and the Internet" (Kathy Kunneke); "Beyond Re-Engineering: Developing Sustainable Success" (Annette McNicol); "Library Digitisation Project Management" (Michael Middleton); "Adaptable Network Cooperate Catalog for Complex Information Objects. From Single Library to a Consortium: Sharing the Management and Distribution of Information Resources" (Azriel Morag); "Is the Customer Always Right? End-User Services in a Networked Age" (Terry Morrow); "Information Literacy Courses at Graduate and Postgraduate Level: Some Experiments and Some Experience" (Paul Nieuwenhuysen); "Improving Opportunities for Research" (Irma Pasanen-Tuomainen); "Ahead of the Game: Developing Academic Library Staff for the 21st Century" (Alasdair Paterson); "User Studies, Library Response: Providing Improved Instructional Services" (Lynne M. Rudasill); "The Changing Role of the Library: Missions and Ethics" (David Russon); "Leading Life-Long Learning: The Library's Role" (Janine

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Abstracts and Fulltext Documents of Papers and Demos given at the 1999 IATUL Conference

Technical University of Crete,
Chania, Greece
17th May - 21st May, 1999.

"The Future of Libraries in Human Communication"

A key icon 🔑 indicates a keynote paper.
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OPENING ADDRESS FROM THE PRESIDENT OF IATUL

Dr. Nancy Fjällbrant

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The Technical University of Crete, in Chania, provides a particularly appropriate setting for the 1999 IATUL Conference - the last IATUL Conference of the millennium. Chania has a rich historical heritage. The earliest settlements were Neolithic and Minoan dating back to 2500 BC. The ancient city of Kydonia became part of the Roman Empire in 69 BC and part of the Byzantine Empire in 325 AD. In 1252 Chania was occupied by the Venetians, until the seventeenth century and the coming of the Turks. Crete remained part of the Ottoman Empire until 1897, and was finally united with the rest of Greece in 1913. The architecture of Chania shows a fascinating blend of styles from all these periods. What could be more appropriate for an international gathering?

The Technological University of Crete is a new university with a modern campus in a beautiful setting, which you are invited to visit this afternoon. This is the first conference that the International Association of Technological University Libraries has held in the Mediterranean region. We hope that this will encourage new members to join IATUL, and provide the opportunity for establishing new and lasting contacts. I would like to thank Anthi Katsirikou and all the members of the Local Organising Committee for their excellent work in preparing for this 1999 Conference. I am sure that you will all have a wonderful time in Crete, with many opportunities to interact and discuss strategies and plan for the future.

In recent years there has been considerable focus on the provision of networked resources on a campus wide network to our university students and staff. Many databases are now made available over the network, and there is an ever-growing number of full-text journals. You will have the opportunity to see and hear presentations about these during this week. Libraries are forming consortia for purchasing resources. There is an increase in co-operation between libraries and information suppliers Some of our users are beginning to say that they are quite bewildered by the wealth of resources available. So it is not surprising to see efforts being devoted to the provision of a common interface to access these resources, and for programs for networked support and education available at the user´s own computer. Examples of these will also be shown during this meeting.

I would, however, like us also to remember another important function of the academic library - as a store of knowledge. Recently at Chalmers University, we have been working on a Web-based resource program for the History of Science and Technology, and we have realised that many people are not aware of the resources that are stored in many of our older university libraries. The eighteenth century saw the establishment of the earliest European institutes for technical education, for example in France with military schools from the 1720s onwards, the Ecole des Ponts et Chaussées(1747) Ecole des Mines (1769) and the Ecole Polytechnique (1794), Mining academies were founded at Freiberg (1765) and Clausthal (1765) in Germany and at Scemnitz (1770) in Hungary. The first half of the nineteenth century was a period of considerable economic growth and development, and technical institutes were established in Germany, Austria, Switzerland, the Netherlands and in Denmark and Sweden. Many of these older institutions have valuable collections of literature which are not available in web-based catalogues over the internet. Few libraries in Europe have had resources for extensive retrospective cataloguing. The *IATUL Quarterly* Volume 1 from 1987, contains a number of articles about these types of resources. I would like to make an appeal to all of you here and to all IATUL libraries, to let me have details of any valuable collections that you may have for scholars of the history of science and technology, so that we can publish these on the Web. This is rather similar to the project carried out by a former IATUL President - Dr. Dennis Shaw - on the availability of doctoral dissertations. I also hope to see how we can facilitate links to libraries in the USA who have extensive collections and are involved in retrospective cataloguing. I look forward to help from you in this work. It seems particularly relevant to make this appeal in Chania with its modern university and rich historical past.

Finally I would like to wish you a happy and successful 1999 IATUL Conference at the Technical University of Crete, in Chania.

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Last edited by J.F, 4th June, 1999.

FROM INDUSTRY TO HIGHER EDUCATION AND LIBRARIES BUILDING THE FAST RESPONSE LIBRARY (FRL)

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Abstract: In the coming millenium, libraries in order to be effective, need to measure their performance rigorously against the expectations and real needs of their customers. The library of the future will need to be customer sensitive, knowledge creating, agile enterprise. It must provide value to every customer, where value is the customer's perception of total lifetime benefits minus total lifetime costs. It must continually exchange information and ideas with its customers and suppliers to deliver customized products and services. The library must quickly reconfigure its products, services and processes, and it must integrate expertise from other organizations to remain competitive. Consequently, it will become critical to create an environment grounded in ongoing innovation and learning – one that will benefit from external uncertainty and unpredictability. Employees will need skills and knowledge to make empowered decisions and work in a variety of roles. This article is written to deal with the need that libraries had to respond fast to the changing needs of their customers. In other words, libraries of the future need to be organized as Fast Response Libraries (FRL). This will be done if libraries be well prepared for dealing successfully with challenges posed by an increasingly competitive and time – responsive marketplace. This requires libraries and librarians to understand and accept that competing against the new sources of knowledge requires a library to use all its resources at the most effective. These resources must therefore be integrated and focused on how best to support the library's competitive strategy.

The Fast Response Organization and the new Manager

There is a revolution going on in management today. Old understandings are being questioned as never before. New insights are changing the way managers understand their responsibilities. Those running the most admired corporations view their companies in a new light, as systems made of interacting and interrelated parts. They understand that the primary purpose of their companies is meeting and exceeding customer needs and expectations. They know that this is what generates profits so they will be around tomorrow. This systems view has brought about a new attitude and approach for successfully serving customers needs. The emphasis is on bringing employees together as team members to execute organizational processes. This approach includes a variety of techniques for helping an organization continuously improve its productivity and the quality and value of its products and services.

Organizations of the future had to respond fast to the changing needs of their customers. This will be done if they are well prepared for dealing successfully with challenges posed by an increasingly competitive and time-responsive marketplace. This requires the organizations to understand and accept that competing against the new sources of knowledge requires that the organization will use all its resources at their most effective. These resources must therefore be integrated and focused on how best to support the organization's competitive strategy.

In this new environment, managers in both manufacturing and service organizations must be capable of conducting and managing complex design, planning, and control activities. In addition, managers must be capable of making decisions, and that requires an ability to think strategically and to understand why and when to do something, not just how. Every manager should understand the impact of operations on corporate strategy and other elements in the value chain and how to integrate operations effectively into the corporation at all levels. Every manager should also have command of available quantitative tools and techniques.

We give emphasis to the context of the leading edge organization we call fast response organization (FRO), a term introduced by Noori and Radford in their book "Total Quality and Responsiveness". An FRO is organized around six dimensions of competition, or competitive drives:

- Product quality
- Total service support for products and for suppliers and customers
- Product and process flexibility
- The strategic use of time, especially as a value adding concept
- Costs, primarily in a customer-oriented, net value sense
- Dependability in honoring commitments in the marketplace

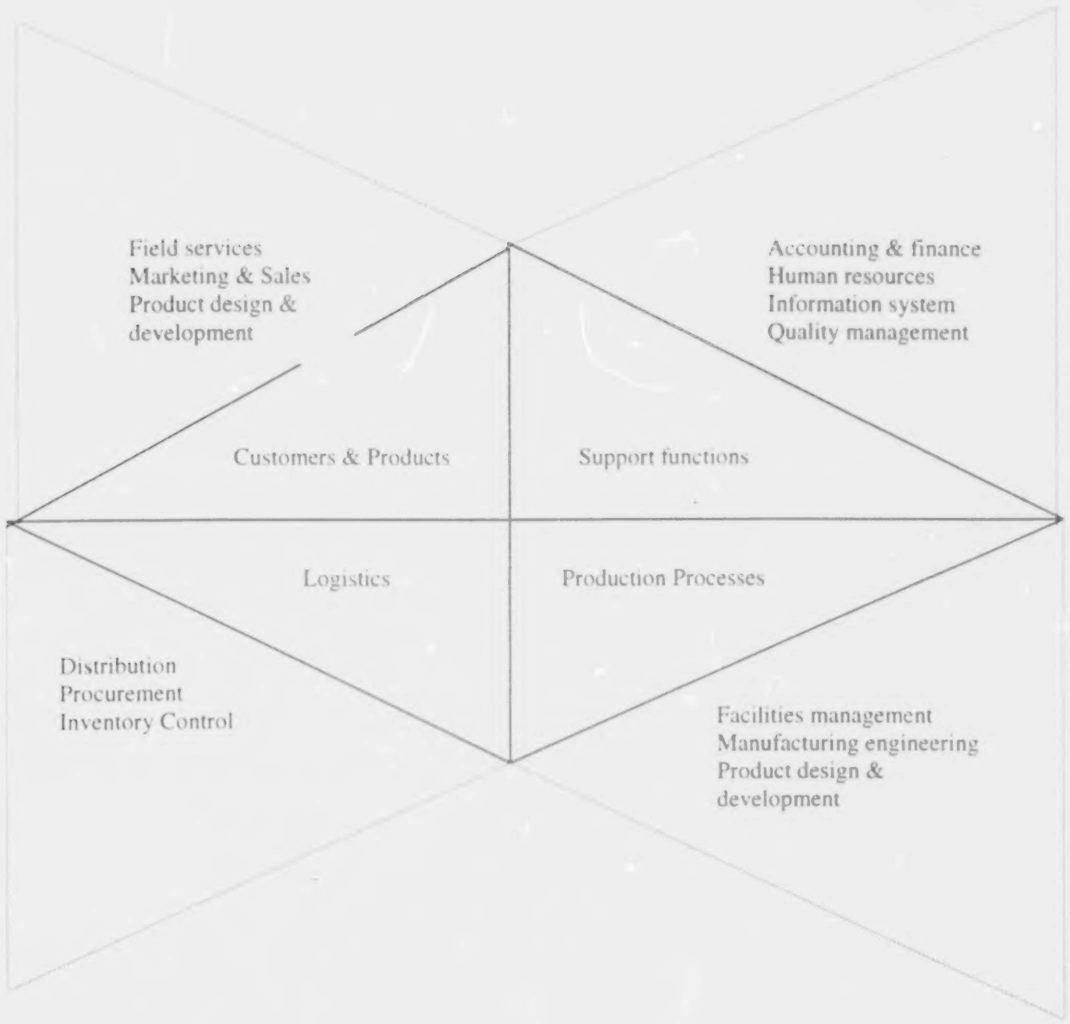
These drivers are an integral part of the philosophy underlying Total Quality Management (TQM). The strategic implication of the TQM philosophy is that FROs must use all their resources to the fullest, including the capabilities of all employees.

We also can find another term, introduced by Steve Levit, for this kind of organizations: Response Managed Organization (RMO). There are many common characteristics between these organizations and the reader can choose the term he prefers.

Structurally, an FRO has relatively few layers of management. A well-integrated, learn organization can react quickly, and individuals within the firm can work together easily. Transforming a multilevel library into such an organization is challenging.

The operations of a library, as at all organizations, can be grouped into four major categories: customers and products, production processes, Logistics and support functions. The close relationships among these categories become clear when one takes a closer look at the activities within each category. As demonstrated by the dynamic diamond in the next Exhibit, this reinforces the need for internal and external integration.

Figure 1: The dynamic diamond: Integrating critical management and operations functions



Sitting behind the front desk of the library at the dead hours of the day, many of the librarians and especially those that are at the upper levels and have some kind of administrative responsibilities, may think of the following:

- We operate of the thinnest of profit margins.
- We are constantly scrambling after suppliers with finite resources.
- We must turn raw materials into extremely value-added products and services at the lowest possible cost and in the shortest possible time.
- We do not always know who our customers are or will be, but when they need us, our response must be fast and accurate.
- We have low-paid, dedicated employees.
- Many of our workers do not even get a payback.

This is maybe not very long from the picture of a non-profit organization. While many non-profits do not experience all the above, most factors apply. Non-profits have people focused on achieving specific objectives for their constituencies. They do this with limited budget and a constant need to raise cash through donations, grants, or assessments.

When talking about how non-profits use quality, it is first necessary to clear up a few misconceptions:

- **You cannot view or run a non-profit as a business**. In reality, for-profit and non-profit organizations operate along similar lines. They both have markets, business processes that produce value-added products and services, and individuals or organizations that provide the funds necessary for the organization to operate.
- **Non-profits cannot measure performance**. In the traditional, profit oriented sense, this is true. Measures such as economic value added, market value, and debt / equity ratios do not apply or are marginally useful for non-profits. We are, however, more interested in the impact our services have on the communities we serve.
- **Quality improvement techniques do not apply**. Nothing could be further from the truth. Non-profit organizations, for several years, have focused on improving their operations with quality management tools and techniques. Like the service industry, non-profits use these methods to enhance operations and address internal and external issues.

A quality-oriented perspective has never been more important. First, there is increasing focus on results. This issue is very basic. Does the non-profit have an impact on the community it serves?

To compete in this world and stay viable, non-profits have and are adopting business-based operational paradigms.

Satisfying the customer

The first test of the effectiveness of an organization's operating system is the ability of that organization to supply customers with products and services they actually want, leaving enough of a margin to enable the organization to prosper in the long-term. This means supplying the products and services needed in the quantities desired and at the time required. This practice is called total product quality. If an organization is not prepared to do this, another organization will oblige its customers.

Although the "who", "what" and "how much" questions asked by the organization in trying to develop the ability to satisfy customers are interrelated, the "who" and "how much" questions are usually asked first, particularly in the traditional model of demand management. In the traditional model, the focus is on the organization's operating system and the emphasis is on figuring out how to move enough products to the final customers to keep the operations running at a profitable capacity.

Setting the stage: Positioning for quality

Have you ever arrived on time for a doctor's appointment only to wait an hour to see the doctor? Or tried to pick up a watch from the repair shop on the promised date only to find out that it has not been touched? Or stood in a growing line at the supermarket and wondered why only half the checkouts were open?

Frustrating customers is not the only consequence of poor scheduling. Product costs soar and quality suffers when feasible schedules cannot be developed and executed.

No matter how successful an organization is, its managers must continually ask questions such as the following.

- How can the organization improve its operations?
- How can the organization utilize its resources more effectively to satisfy customers' needs?

Organizations intent on succeeding in the modern competitive environment must understand the new character of competition. These organizations also have to internalize the new drivers or levers of competition and advantage and learn how to use them in this environment. Until these things are done, building an enterprise that can sustain growth will be difficult.

Minimizing the time "distance" between recognition and satisfaction of customer demand is a necessity for an organization that wishes to remain responsive in a competitive environment. Demand management and internal control of operations first establish the demand to be met and then determine how to satisfy it in the most effective and efficient manner. Internal conditions are only one part of the process, though, and most librarians ask the following questions:

- How should the library manage its relationships with its suppliers?
- How can the library influence the passage of its product between its production facility and the consumer's hands?

Both questions acknowledge the tight interdependence of all the links in the value chain and the need for effective management of the entire process. Fast-Response Libraries cannot coexist with slow suppliers and a tortuous distribution system.

Many managers are asking themselves how they can make their organizations competitive, in the rapidly changing global environment, just as many are asking how they can focus their competitive strategy. There are some competitive characteristics shared by many organizations, and no organization can succeed without every person with a stake in the organization working constantly to improve the organization's effectiveness in these areas. The term for the philosophy underlying the enactment of these themes is fast responsiveness. This implies a customer-focused organization and an operation fully committed to total quality management (TQM).

But what does it mean, though, to satisfy a customer? Customers are satisfied when they receive the total product they desire, including ancillary and support goods and services, at a price they can afford and accept. If organizations fail to do this and customers have other ways of satisfying their needs, the customers will migrate and the organization will fail. This type of attrition happens more rapidly in turbulent times, when customers are prepared to search for alternatives.

It is important therefore for every organization to recognize the central position occupied by its customers and the need to have its primary aim their satisfaction. This recognition is widely accepted, although is still confusion about what it implies operationally.

The need to satisfy customers is being recognized by non-business organizations as well. An increasing number of governments, government departments, and government supported groups have developed awards that highlight and promote the need to satisfy the customers. Underlying most of these awards is the recognition that the profitable survival of for-profit businesses is an essential ingredient in the survival of the local, regional, and national economy.

As we said above, it is easy to agree on the importance of satisfying the customer; however, it is another matter to agree on the definition of customer satisfaction. What may differ are the ways in which these issues have to be addressed in each instance.

Responsiveness

Satisfying customers is in part a function of responding to real needs and expectations, which are constantly evolving and changing. This is perhaps the most critical management issue, and many organizations are reluctant to alter a previously successful formula. Responsiveness is not a reaction; it is a planned state of preparedness to which the successful organizations aspire. This preparedness is both tactical and strategic, often dealing with issues about which customers may not be aware.

Complexity

Satisfying the customer is becoming increasingly complex. Because of increasing knowledge and changing competitor actions, customers expect to be satisfied across a widening range of factors. Management of this increasingly complex sense of products requires an increasingly complex set of management skills. In most instances this complexity can best be exercised in a group than an individual decision-making setting.

Unity of Product

The traditional dichotomy between service and manufacturing operations must be questioned. There is a difference between tangible and intangible elements, and virtually all products have a mix of these elements. Thus organizations may benefit by developing a new understanding of what a product actually is.

It must now be recognized that each product consists of a core concept, critical components, and facilities goods and services. The core product concept defines the basic business. Facilitating goods and services are disrectionary product elements by which an organization differentiates its products from those of its competitors.

Integration & Value Added

Increasing complexity can lead to confusion and chaos. Organizations therefore need to eliminate confusion through control devices that ensure that every person and function works with the same information and toward

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the same ends. This integration of functions, processes, and products must have a focus, and in all the successful organizations the focus is the customer and satisfying the customer. In fact, each organization has institutionalized the customer focus; that is, everybody in the organization accepts the customer's central position.

If the focus of the organization is the customer, everything the organization does should improve matters for the customer. This gives rise to the concept value added and to thinking of processes and activities as being either value-added or non-value-added activities while enhancing the value they add to the customer at every step. This concept applies not only to essential manufacturing steps but to managerial, administrative, and service activities as well.

Operations Excellence & Teamwork

To be responsive, an organization has to have excellent operations. Excellence in operations is not the only factor, of course. Operations must also be capable of effectively supporting what the organization wants to do. This means a couple of things: first, the operations must be well managed, and second, every manager must be aware of what the operations function is capable of supporting.

Integration, responsiveness and excellence all imply teamwork. The teams exist in the operating areas and markedly improve performance. The organizations also use teams in other areas, starting with effective senior management teams.

Difference & Commonality

Each organization is different from the others, and each is unique in many ways. These differences are manifested in several ways: products, processes, markets, pressures on managers and other people, means of evaluation and control, and ways of organizing the enterprise.

There are, however, underlying characteristics that are common to all successful organizations:

- Close links between the organization and its customers
- Close links between the organization and its suppliers
- A commitment to continually improve the ability to compete simultaneously on cost, quality, flexibility, dependability, time, and service
- Effective use of technology for strategic advantage
- A less hierarchical, or compartmentalized, organization

- Policies that promote continuous learning, teamwork, and flexibility

Where does all this place us?

Why is all this important? In a word, competitiveness. In most organizations the function that has the greatest impact on profitability is operations, for the operations function by and large adds the most value to an organization's products. No single function is more critical to the success of an organization than is any other. Without excellence in all functional areas, organizations cannot complete for long in free, competitive markets. The role of operations is to support the objectives and strategy of the corporation as effectively and efficiently as possible. This requires that people in general management and other functional management positions understand how they affect, and are in turn affected by operations decisions. Integration and responsiveness can come about only as a result of understanding and cooperation.

All managers must therefore have a good understanding of the principles that underlie the processes of designing and managing operating systems, integrating those systems with the rest of the organization and the external environment, and making the operating systems even more competitive as environments and resources change.

FRLs are composed of closely coupled functional areas. Almost every activity in which a functional area is involved influences and is influenced by other functional areas. As the library becomes more integrated and the boundaries between functional areas become hazy, the ability of managers in other functions to communicate and work closely with operations managers becomes more important. Accountants, for example, need to understand the processes by which goods and services are produced to keep the Library's internal cost accounting systems timely and informative. Human resources professionals need to help develop the technical and problem-solving capabilities required by the people on the shop floor. Purchasers need to coordinate deliveries more closely with the library's production schedule. And everyone needs to be actively involved in the firm's quest for total quality.

Organizing operations for competition

The competitive and social context in which organizations compete is changing. As a result, managers must reevaluate their attitudes and approaches to competing. The strong implication here is that only organizations that actively implement TQM will prosper in the new competitive environment. Understanding the framework is therefore important.

Customer satisfaction leads to customer loyalty, which, according to recent studies, is crucial to long term profitability. Loyal customers spend more, refer new clients to the organization, and are less costly to do business with. Attracting a new customer tends to be about six times as expensive as retaining an old one. Knowing what entices a customer to continue to prefer one product over another or deal with organization A rather than organization B is therefore of great concern.

Obviously, the specific factors that influence the buying decision from one type of product to the next and from one market to another. Finally, however, it can be concluded that these factors can be grouped into at least six broad categories, the six dimensions of competition:

- Cost
- Quality
- Dependability
- Flexibility
- Time
- Service

And organizations have to compete to all six dimensions, because if they do not, they tend to distort the information and therefore their responses. This can be translate to mean that a manufacturer or service provider should take into account of every competitive dimension a customer or market might consider in trying to decide whether to purchase the manufacturer's product or use the provider's service. If the market begins to use a larger set of criteria against which to judge suppliers, an organization must use all those factors when deciding how to satisfy its potential customers. The leading edge organizations are considering all six dimensions and looking for synergies among them rather than trading off against each other.

Admittedly, managing or considering all six dimensions simultaneously is difficult. An organization can, however, gain a definite advantage by considering more factors than do its competitors, especially if the extra dimensions or factors are perceived of as valuable by its customers.

Organizations that can compete along all six dimensions are referred to as Fast Response Organizations (FROs). A fast response organization is built around the six dimensions of competition: cost, quality, dependability, flexibility, time, and service. Such an organization is capable of using different combinations of these dimensions of competition to address the needs of its customers in different markets. Fast response organizations actively embody the TQM philosophy. FROs must have successfully implemented the TQM philosophy, and successful implementation of TQM must result in fast response organization. Although the two phenomena are different, they are inextricably connected. Developing the ability to compete simultaneously along the six dimensions of competition and becoming a FRO can be a challenging process. In most cases it calls for a radical departure from the traditional role of operations in an organization. What became clear there is that successful organizations invest heavily in certain structural prerequisites to enhance their operations. While the nature and extent of these investments may vary, it can be identified four distinct structural prerequisites:

- An emphasis on continuous improvement throughout the organization
- Investment in research and development
- The adoption of advanced product, process, and organizational technology
- The integration and coordination of activities throughout the value chain

As with the six dimensions of competition, no one structural prerequisite is always more important than any other. All four must be satisfied, but the emphasis placed on each varies from one organization to the next, from one industry to another, and over time.

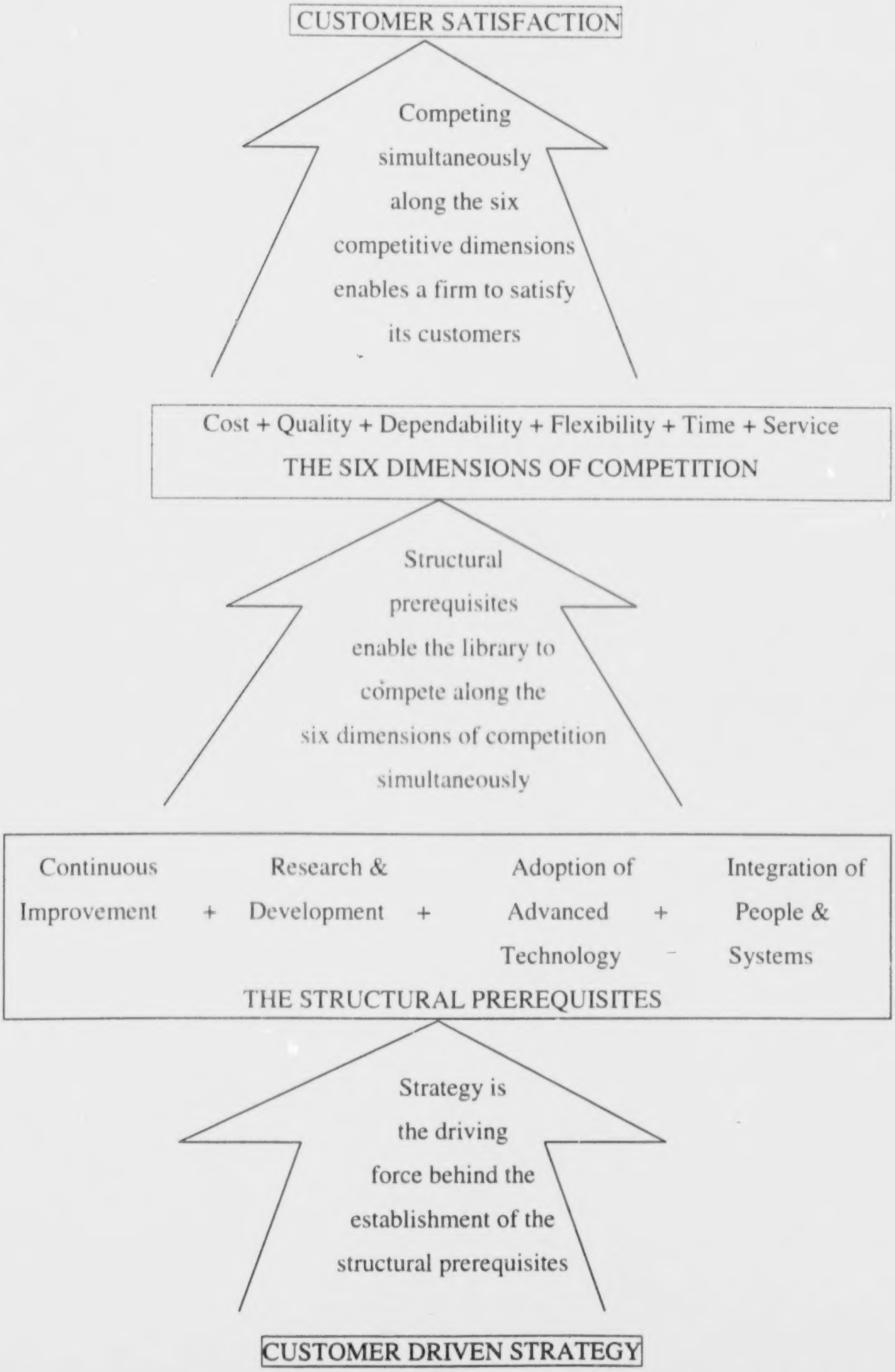
The degree to which total integration can be achieved in an organization is dependent on the organization's structure, information system, and people. Of the three, it is the attitude of the employees that is crucial. When all is said and done, it is people who do the essential integrating within organizations.

Structurally, a FRO is a flatter organization than an traditional multilevel one. This facilitates horizontal integration and allows a FRO to take advantage of many small but cumulatively significant improvements to its operations. In a multilevel organization departmental responsibilities are often clearly delineated. In this environment small improvements that affect more than one department are difficult to implement because information must flow up several management levels before it can be shared between functional areas. Since the success of each department is usually measured independently of the success of the organization, there is little motivation to work together.

Removing management levels means that more responsibility and authority must be pushed down through the organization. Empowering its employees enables an organization to tap its true potential but requires the organization to make a sincere, long term commitment to ongoing training and employee development. Job descriptions, career paths, reward systems, and department charters must be aligned with the FRO's new structure.

The exhibit at the next page, can be viewed as a road map for a FRO to follow as it strives to reach its goal of delighting the customer. The structural prerequisites enable an organization to satisfy its customers continually by competing simultaneously on cost, quality, dependability, flexibility, time, and service. However, strategy, is the driving force behind the establishment of the structural prerequisites, and it must consider very important. This framework applies to organizations in the service sector as well as the manufacturing, and of course to libraries as well.

EXHIBIT : The FRO descriptive framework



CUSTOMER SATISFACTION

Competing simultaneously along the six competitive dimensions enables a firm to satisfy its customers

Cost + Quality + Dependability + Flexibility + Time + Service

THE SIX DIMENSIONS OF COMPETITION

Structural prerequisites enable the library to compete along the six dimensions of competition simultaneously

Continuous Improvement + Research & Development + Adoption of Advanced Technology + Integration of People & Systems

THE STRUCTURAL PREREQUISITES

Strategy is the driving force behind the establishment of the structural prerequisites

CUSTOMER DRIVEN STRATEGY

Managing for Product Quality

Fragmenting markets. Rapid technological advancement. Shortening product life spans. Intense global competition. These trends are rendering the mass-production approach infeasible in a growing number of markets. In these markets a multiple-niche strategy - producing a family of products, each of which responds to the needs of a specific customer or market segment - is much more successful.

Until recently, product design was largely confined to the introductory and growth stages of the product life cycle. Once a product had matured and a dominant design had emerged, organizations standardized product design and began to pursue economies of scale. Specialized production equipment was put in place where possible, and few, if any, fundamental in the product design were made from then on. The most costly the effects of redesign, the less likely the redesign.

Almost all organizations are finding that they must increase the speed with which they design products as well as the quality of those products. There is no time to waste. An organization must develop products that satisfy customers' needs and expectations the first time and on time.

The trend toward implementing advance flexible technologies has also had an impact on the nature of product design. To fully realize the productivity improvements promised by these systems, product designers must be familiar with their capabilities and limitations. The product design must be carefully matched to the process by which the product will be made.

These new challenges call for a drastic change in the way in which products are designed and in the role of production in the development process.

A Fast Response Organization constantly looks for new product concepts that meet market needs and exploit the full potential of its resources. Ideas for new or improved products come from a variety of sources. The firm's research and development department may generate many ideas. Feedback from customers may trigger other ideas. Competitors, research institutes, technical literature and suppliers may also be the inspiration for new products.

Transforming an idea for a new good or service into an actual product is usually time-consuming and expensive. The costs associated with making major changes to a product concept or abandoning a product concept increase dramatically as the product development process progresses. Therefore, a rapid but effective process for identifying winning product concepts is essential for an FRO.

If the responsibility of the operating elements of an organization is to get products or provide services to customers, they must be the appropriate products or services. Consequently, designing products is a critical function. Organizing for design means organizing to identify appropriate products and getting those products to market in the shortest possible time.

It is now recognized that products should be designed to function effectively and efficiently for the whole life, not just until the warranty period is over. While this may seem obvious, until recently few products were designed to be recycled. By designing for reparability and serviceability, a manufacturer reduces a customer's in service costs; that should weight in the manufacturer's favor. It is interesting though, that designing for repair and service automatically means designing the product for manufacture.

Product suggestions can come from anywhere, and an organization must have a good process by which concepts are filtered out to ensure that design work proceeds only on the concepts with the greatest potential. It is important to identify the better concepts and turn them into appropriate products in the shortest possible time. The organization for this invariably involves parallel development of product elements or even parallel development of competing product concepts. This is necessary to minimize design time while not committing the organization to a final decision until the last possible minute. Reducing design cycle time allows the organization to capture what the market wants in a product before the mind of the market has changed. Product design takes time, but if an organization can design in half the time it takes the competitors, that organization should have more appropriate products on the market.

To give itself a better chance of having the right product, an organization needs to use all the design expertise it has available. This means involving design elements from the whole value chain. There is everything to gain by using suppliers and customers to help with the design. If all the people in the chain have real influence on the product, then their concerns will have been met. And if everyone's concerns have been met in design, that will make building the appropriate product a lot easier.

Designing In Product Quality

Success in today's market depends on how quickly companies identify their customers' needs and expectations and develop and introduce new products that satisfy those expectations. Continued success, even survival, hinges on the organization's ability to continue adapting products to changing market needs.

As they develop and control the product design process, managers need to ask these questions:

- How can the organization ensure that the "voice of the customer" is guiding its design efforts?
- What is the customer's perception of quality? How can the organization measure this?
- How can the organization estimate product costs and profitability early in the design process?
- How can the organization continually improve the product design process?

Designing an appropriate product for the marketplace involves more than the basic product design. It is a process that starts with customer needs and expectations, which turned into product requirements. From there an organization develops product and then process specifications and then produces the product. Product design does not take place in a vacuum: it starts and ends with the customer but also involves the ability to produce the desired product.

It should come as no surprise that the newer tools for product design work best in organizations that are already noted for quality. That should not stop other organizations from using these techniques; they merely have to accept the fact that their benefits will not be as great as those of better organizations until they improve sufficiently to take full advantage of the techniques.

What does an organization try to achieve with the newer approaches? First, products that are better suited to their operating environments by being designed to operate effectively within understood environmental parameters. Second, better understanding of total product costs, including whole-life approaches to cost. Included in this are notions of strategic allocation of overhead to the principal component of variable product cost. An organization wants to control systems that encourage managers to make decisions that fit in with the corporate strategy, and most cost allocation systems do not do that.

Third, the organization is trying to build in automatic processes for verifying product or process design. If the organization can identify in advance and then eliminate critical failure or cost-incurring characteristics, it can reduce the whole-life costs for its products.

Quality is what the customer wants at a price the customer is willing to pay. This value-based notion of quality is becoming more widely accepted and should drive quality decisions. An important characteristic of this definition is that there can be too much quality in a product. If a product does more than the customer requires or costs a great deal more than a competing product that does not do as much, the organization is likely to lose customers. This upper limit to product quality is one that can be expected to increase as time goes by and customer needs and expectations increase.

The critical implication here is that organizations should design products that meet customers' current needs and expectations and should keep improving products at a slightly faster rate than the rate at which expectations change. This will lead to customers who are continually delighted with the organization's products, and delighted customers are not likely to defect.

Designing Service Processes

Selecting the most appropriate process for producing a firm's goods and services is an important decision management must make. In the 1980s it was estimated that a typical company spent about one-quarter of its operating budget on finding and fixing mistakes on the production line. A significant percentage of direct laborers were not producing anything; they were just reworking products that had not been properly made the first time. To compete effectively, libraries must develop efficient and responsive operating processes.

Process designers face special challenges in designing a process that produces services rather than goods. In many cases, the customer exerts a great deal of influence on the process. Think about a bank, a grocery store, an airline counter or a library. The length of time needed to serve each customer is usually quite variable, as is the nature of the service demanded. The inability to create an inventory of services during low-demand periods to offset high-demand periods increases the difficulty of smoothing the production flow.

Usually, it is possible to split a service operation into two identifiable parts: one that makes contact with the customer (front office operation0 and one that is free from customer contact (back office operation0. The split is important, for the more that can be placed in the back office and isolated from the customer, the more that can be managed and designed in the same way that a manufacturing operation works.

Designing Customer Contact Operations

Designing an operation with the psychological needs of the customer in mind is very important when the customer is involved in the process. The facility layout must take this into account, and the service providers have to be trained in interpersonal skills as well as in the technical details of their tasks.

Reducing variability is another key consideration in designing operations with a high degree of customer involvement. Let us quickly review some of the more commonly used tactics for doing this:

- Use a reservation system to smooth demand.

- If a reservation system is not feasible, serving customers by numbers or having a centralized queue rather than a queue in front of every server can speed the flow of customers through the system.
- Cross-train employees and assign them to tasks on the basis of current customer demand
- Design the process for peak load and have employees perform secondary functions during slow periods.
- Segregate customers by the type of service they want.
- Transfer routine tasks to the customer.

Shostack (1984) has developed a systematic approach to designing service processes that utilizes a special type of operating flow chart, called Shostack's service blueprint.

Shostack's approach to designing service processes is bases on the need to develop a more objective and quantifiable approach to designing systems that have been acknowledged to require judgement and subjectivity in design. To explore all the issues inherent in creating or managing a service, Shostack suggests that the following four steps be taken:

Step 1: Identify processes. Develop a service blueprint (process flowcharts) for the total process, being careful to differentiate between activities performed in front of the customer and those performed out of the customer's sight. The line that separates the processes is called the "line of visibility".

Step 2: Isolate fail points. Determine the points where the visible production system may fail. Built in corrective measures that make the system fail-safe.

Step 3: Establishing a standard execution time for the process. Estimate the amount of time each step in the process should take under normal conditions and the maximum amount of time the customer is prepared to spend in the system. These times become service standards.

Step 4: Analyze profitability. Continuously monitor the profitability and the time taken to service each customer. Analyze in particular variances in time caused by failure and the point at which time delays result in unprofitable business.

For every productive unit there is a specific product mix to be made within a specific corporate strategic context. This means that there is an appropriate manufacturing process by which the product mix should be made. The same is true of service processes. Process design should therefore be easy.

Why, then, do so many managers make strange process design decisions? The answer is that these decisions are not simple. The relationships among people, machines, and raw materials can be complex, and any change may lead to differences in these relationships of which a firm is not aware.

Remember, too, that the organization concerned first with effectiveness and then with efficiency. Any process must produce the desired output. Then the organization can think about making the process better. In a quickly changing environment the organization will probably never reach the stage at which its processes will be perfect; the processes should therefore be designed in part for relatively short lives and for adaptation so that they can be changed rapidly. As the organization's knowledge expands and the need to be involved with smaller market segments grows, designing for flexibility will be the aspect of effectiveness that predominates.

Manufacturers no longer make a physical product and dump it into the marketplace; now there is a great deal of service content in a successful product. Of course, service organizations have always been concerned with service design, but now every organization has to be concerned with designing appropriate products and services. In high-contact service industries in particular, the effectiveness of the product is in the hands of the service provider. As part of the service process design, therefore, organizations should ask themselves how they can more effectively support the front line staff.

Integration & Responsiveness

Integration and responsiveness must extend throughout the value chain if a library expects to become a fast responsive organization. What most needs to be integrated is information. From a physical distribution standpoint, goods should be constantly in motion until they reach the ultimate customer, and this movement should be swift and direct. The shorter the time between the start of the journey and the time when the complete product is in the customer's hands, the less uncertainty can enter the internal and external environments.

Integration is knowledge-extensive, and computers will be increasingly relied on to achieve it. Managers, and librarians, need to remember, though, that critical flexibility and responsiveness can be achieved only through people and non-programmed activity. While the communication links make accurate and fast information transfer possible, people make the critical decisions. This applies particularly to strategic decisions involving the design of products and processes and the timing of product introduction. System architecture cannot take into account hesitant decision making or a poorly implemented concurrent engineering philosophy.

Invariably, the value chain cycle time is longer than the time a customer is prepared to wait for a product. This is particularly true of items expected to be on the shelf. Inventory has to be carried in the value chain, and logic dictates that location be as close as possible in time to the customer. The shorter the physical re-supply time, the more product mix risk the retailer can take and the less inventory is needed on display. Time is money for everyone in the value chain. Because travel time is only a small fraction of total cycle time, managers should look for time savings through improvement in internal procedures and elimination of unnecessary storage points rather than through faster and more costly means of physical transport.

Conclusions

The Fast Response Library is the paradigm for the successful library of the present and the near future. Nothing is permanent, though, and librarians, like managers in a company, need to think about what the longer-term paradigm is likely to be. If history is any guide, the future can be dimly glimpsed by extrapolating the trends examined throughout this article. The most significant of these trends are outlined below:

- An increase in the number of Libraries competing internationally and locating facilities around the globe.
- A trend toward project-specific organizations, alliances formed within organizations to achieve time and scope limited objectives.
- The development of global NetWare, of software designed to integrate activities across the organization and the whole value chain. The information superhigh- way is a precursor of the structure required to support this NetWare.
- The use of knowledge as a fundamental competitive weapon and the development of computer-based intelligence to determine what knowledge will be required to compete effectively against other global competitors.
- An increase in the strategic use of time-based competition.

The competitive libraries of the future will therefore still need to be agile. Agility implies the ability to do the following:

- Continuously monitor market conditions and market demand.
- Quickly respond to demand conditions by providing new goods, services, and information as the need is recognized by the market.
- Quickly introduce new technologies.
- Quickly modify the way in which the firm does business.
- Quickly use the abilities of all the people in the firm's value chain.

How this will be achieved is conceptually straight-forward: the senior management of the organization will develop an organic approach to competitive structure, using the information spine of the organization to link together focused networks of organic elements along the complete value chain. These networks will consist of units from within and outside the parent organization, cooperatively rather than legally integrated through the pursuit of mutually beneficial market objectives. These limited-duration organizations will be developed in response to market need and disbanded when the need is satisfied. It is these organizations, which will use enterprise integration and will need integrative software that allows planning and integration at the global rather than the local level.

What form the integration will take is not clear. However, its implementation will be fraught with challenge and difficulty because even the best organizations still cannot effectively manage existing local integrative mechanisms. These integrative technologies are global only in the geographic sense, allowing managers to coordinate limited activities at different places. As everyone knows, though, global also means across all elements and all activities.

The closer one gets to enterprise organization, the closer one gets to the operationalization of economies of integration. That means, the potential to eliminate niche competitors by allowing global competitors to battle over very small markets as well as very large ones. This will require changes in the nature of industry organization, the nature of competition, and the nature of the organization. How these forces will evolve is difficult to predict, but thinking managers must prepare themselves and their companies for the new forms of competition that will inevitably occur. These managers will not develop the newer and more powerful technologies that will allow true global integration of the enterprise or be able to dictate the nature of market demand or industry dynamics. They will, though, need to be able to respond to the challenges presented by these changes so that their organizations can evolve to meet the new competition. Strategic responsiveness and agility are, and will remain, dependent on the abilities, imagination, and inclination, of organization managers.

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United way of America's Excellence in Service Quality web site at: http://www.unitedway.org/quality

MANAGING THE NEW LEARNING AGENDA IN A CONVERGED SERVICE ENVIRONMENT

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INTRODUCTION

An essential element of the present British government's agenda is lifelong leaning (1). In setting out its policies the government has acknowledged the importance of librarians as trainers and has supported this view by providing a huge new investment programme the will benefit public librarians (2). It is the first time in the UK that the work of information professionals has been so publicly acknowledged and supported.

If it is now accepted that the training role is one to which we have a legitimate right, we need to start considering what implications this has for our future development. Certainly questions about the way that training is provided, the place of training in the learning process and the use of IT in the process are all legitimate areas for research and investigation.

The learning agenda and higher education

Though the main emphasis of the UK government has been in the area of public library development it is in the higher education sector that advances in the training role have been most significant. Since the publication of the Dearing Report (3) on higher education there has been a change of emphasis towards learning and away from teaching. Academic staff are expected, for example, to see themselves as learning managers rather than simply as teachers. This approach helps to define the role of information professionals especially when IT is involved. It is especially evident in a converged service environment where there are increasingly signs that they are beginning to be more positively appreciated in the learning process than traditionally has been the case.

Converged service model

The converged service at the University of Birmingham was established during 1995 and brought the university library, computing service, television service, learning accommodation and printing service together into one organisation. Split into five vertical divisions it operates in the following way:

Public Services administers traditional library services including lending, reference and enquiry services, and the publications programme;

Information Computing and Support runs the centralised computing service including the central mail service, the campus network, licensing agreements, computer development work etc;

Planning and Administration includes personnel and planning, buildings and maintenance;

Collection Management covers acquisitions, cataloguing, special collections and the bindery;

Learning & Research Support (L&RS) includes School-based computing services, library liaison, IT training, IT-based learning support, television services, and the administration of teaching accommodation, etc.

Learning & Research Support
The innovative approach to services that L&RS represents has been important in changing the views of academic staff about the role of information professionals on campus. Talking about information professionals rather than just librarians is essential given the mix of skills necessary to ensure that effective learning support is provided.

L&RS is made up of three subject teams; Science & Engineering, Medicine and Life Sciences, and Arts Social Sciences and Law. Each of them is a hybrid team made up of librarians, computer officers and IT advisors and trainers. Other teams in L&RS include the Teaching Accommodation Team which manages the University's centrally organised lecture rooms and the Television Services Team.

Such a focused approach to learning support ensures that Information Services is a part of the strategic planning process for learning and teaching at a central university level. Consequently the value of information professionals is more widely accepted at all levels. They are therefore called upon to offer their expertise and involve themselves in new developments in a way that was rarely the case in the traditional library structure.

Though the preconceptions of some academic teaching staff were difficult to breakdown at first, mutual respect and understanding has grown over the past four years or so. Equally the building of hybrid teams has been a developing process and gradually the logic of working together has produced a climate of co-operation and an appreciation of one another's skills.

Innovations in learning support
The embedding of Information Services in the development of the University's learning strategy and the availability of strong hybrid teams to encourage innovation and deliver support has been a significant aspect of convergence at Birmingham.

Two current projects can help to illustrate the ways in which information professionals are pro-actively involved in the development of the learning and teaching process. They show that information professionals are going beyond the simple acceptance of their training role and are pressing for their wider role to be acknowledged.

Learning Support Partnerships
One of the ways we in Birmingham have tried to encourage co-operation between Information Services and the academic Schools has been through the creation of Learning Support Partnerships (LSPs) in the eight Schools for which the Arts, Social Sciences and Law Team is responsible. This initiative was set up to encourage the process of developing, in a structured way, learning support interfaces as an essential part of the academic process. It was launched because there was a need to encourage such developments in a more proactive way.

Although there were one or two IT enthusiasts in each of the eight Schools involved, the vast majority of academic staff was reluctant about the process. Even though they may have believed the possibilities were worth exploring, most of them either didn't have the time to develop their ideas, or were afraid of the technology involved.

Even though the University's Learning and Teaching Strategy in 1997 had stated that it wanted to have 50% of modules using IT in the learning process within 5 years, little progress had been made in these subject areas. The intention of the LSPs was to help kick-start the process by offering expert support while trying to rationalise the use of scarce staff resources.

Essential to this development, and a scarce resource, are the IT Advisers and Trainers in the L&RS subject teams. Each of them is an expert in the development of software, the presentation of information, and the creation of search interfaces. Much of their time, however, is spent in undertaking IT training and they therefore have less time to devote to other projects than would ideally be the case. The need to create a channel for approved new project proposals by the Schools was essential. Otherwise each enthusiast would press his or her proposals regardless of overall School need.

Through the Partnership arrangement the skills of the whole team, Learning Advisors, Liaison Librarians and Computer Officers are brought together to provide a comprehensive package of support. In addition the LSPs benefit from the training offered by Learning & Research Support on a number of computer packages. This includes training on Microsoft FrontPage, a program that allows individuals to create Web pages without the need to learn html. The way that such in-house expertise can be brought together to support other internal initiatives is evidence of the synergy that convergence can offer.

Although it was the need to develop learning interfaces that was the initial impetus for the creation of the LSPs, wider organisational changes within the Schools have become necessary as a consequence. It has been impossible, for example, to talk about developing individual learning spaces on the Web without discussing where they would fit into a Schools overall Web structure. Equally, questions of who is to undertake the inputting of information has led to the training of clerical support staff in the use of FrontPage. In short, once the value of the Web is realised in one area it has had a knock-on effect in the wider use of the technology.

When one considers that there was little co-ordinated Web development in these Schools before the launch of the Partnerships project, progress has been considerable. If this has not yet all become evident in terms of tangible Web pages, it has started serious discussions on the role of the Web in the academic process. It has also ensured that information professionals are at the heart of these developments. Though the initiative is continuing the process by which the LSPs have so far developed can be outlined as follows:

> i) *Launching the Project.* This was a deliberately low key process. The aim was to present the proposal for a recognised partnership at a time when it would be best received in each of the Schools. As predicted there has been a mixed response, but all except one of the targeted Schools have participated.
>
> The intention has always been to empower the individual lecturer, and through them, the School in developing Web interfaces for their learning process. It was originally envisaged that a small working group of interested academic staff would be set up in each School. This would work in co-operation with the L&RS subject team and make it possible to develop a number of agreed projects each year. Building on this growing momentum, enthusiasm and expertise, the School would gradually move towards the University's learning strategy targets.
>
> ii) *Web structures.* While working with those Schools who had been the first to participate it became evident that further refinement was necessary. Although individual Web projects were identified there was no thought-out School Web structure in which a new Web site could be placed. Such an arrangement gives coherence and helps students find their way around more easily. Though all Schools had put up a Web site and made links, they had gone no further. It was necessary, therefore, to suggest that a firm Web structure should be looked at and recommendations were made on the best ways to construct a coherent site that would cater for both their Internet and intranet requirements.

iii) *Organisational changes.* There then followed questions about who would do the inputting of information and who would maintain the sites once in place. The question of editing was also raised, for the way that information is presented on the Web ought to be uniform and also have some authority if it is to be taken seriously. Consequently discussions are going on within Schools about the roles of their staff in this regard. In addition the possibility of identifying Webmasters to manage the sites is being considered. In at least one School a formal Web Development Board of senior academics has been established to oversee developments.

Training Teachers in Higher Education

A second innovatory development at local level reflects those that are taking place on a national basis in the UK. The Deering Report (3) made a recommendation that an Institute for Learning and Teaching (ILT) should be established to provide a qualification in learning and teaching for HE lecturers.

From the start of the academic year 1999-2000, the ILT will be in place to encourage new academic staff to qualify for a certificate once they have been recruited to the staff of a university. This qualification, though not yet compulsory, is regarded as an important development that will eventually ensure that teaching standards will improve in the sector.

The working group that is setting up the ILT has produced a discussion paper (4) to ensure a wide consultation across the sector before firm proposals are made. They have proposed that some individuals will qualify as full members while others will receive associate membership. The original proposals left little scope for information professionals to qualify for either category but there is now evidence that this will be radically changed when the full proposals emerge. It seems likely that information professionals will be able to achieve full membership and be put on the same level as their academic colleagues.

This development is significant, not only in the recognition it will give to the importance of the role of information professionals in training and assessing students but also because it acknowledges the role that they play in training staff.

Training Teaching Staff at the University of Birmingham

The University of Birmingham has decided that it will make compulsory the enrolment of new academic staff on an induction course and award its own qualification for academic teachers. This will allow them to register as members if the ILT. The pilot year for this is the current one and Information Services have been very much involved in the process.

The model offers a set of taught modules followed by the logging of approved assignments in a portfolio to be presented for examination at the end of a three year period. Information Services has two compulsory modules on the initial part of the course and will probably be very much involved at the individual project level. The acknowledgement that information professionals are at the heart of the process of training academic staff is important.

In terms of the training that has been offered on the course the feedback on the compulsory modules has been mixed, even though those who are teaching have a good record of training success. This may well be because of the essentially unfocused nature of the training that is having to be offered. Information professionals usually target their courses towards subject groups or to those who want to learn a particular database or skill. Training groups of academic staff who have mixed needs and expectations demands a re-think of approach and style if unquestioned success is to be achieved.

When it comes to helping with the approved assignments of the students the problems are different. Here the students will be very focused on developing different projects and will demand staff resources to meet their requirements. The range of these will span the responsibilities of Information Services and will include, amongst other things, Web site creation, literature searching and database development.

The embedding of information professionals in the learning support process therefore requires not only a rethink of the way in which the skills base is portrayed but increased investment to meet the growing support needs of the users. With there being over 40 new lecturing staff a year enrolling on this course and each of them having 3 years in which to complete their assignments the staff resource implications are likely to be considerable.

Summary

This paper has described the increasingly dynamic involvement of information professionals in the learning and teaching process in higher education. Converged service environments can facilitate novel and speedier progress in these areas because of the cohesion of hybrid teams. Such teams bring together the specialist skills of differently qualified and experienced information professionals. This can and should result in a dynamic, pro-active approach to the learning support process.

The growing acceptance of the information professionals role in delivering the training necessary for the lifelong learning process is not misplaced. The recognition does however bring responsibilities and it is now necessary to consider how the next steps in this process can be managed. Consideration needs to be given to the training of more hybrid managers, the development of teaching skills for information professionals, and the devising of quantitative and qualitative measures to help justify the provision of additional resources for the learning support process.

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RE-ENGINEERING ACADEMIC LIBRARY SERVICES - THE CASE OF THE TECHNICAL KNOWLEDGE CENTER & LIBRARY OF DENMARK

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INTRODUCTION

The traditional mode of operation of academic libraries is in deep crisis0. Primary reasons here is the combination of zero growth funding, rapid escalating pricing on information resources (especially scientific journals), and necessary investments in technology, human resource development and increasing customer expectations.

DTV is the university library at the Technical University of Denmark and as well the national centre for technical scientific information in Denmark. DTV has like many other academic libraries experienced the above problems during the last decade. Operating with more or less stable funding during these years extensive cancellations of journals have taken place. The number of subscriptions has declined about 40% while the expenses held for purchase of books, journals etc. has increased about 20%. It is obvious that this development cannot proceed in the long run and that this will bring the concept of the comprehensive academic library in question.

As there is no reason to expect significant increase in the funding of the library the above in itself calls for fundamental reconsideration of the roles of the library, its services and mode of operation. Furthermore the dramatic developments in information technology during the last 6-7 years put a lot of pressure on investments in information technology and as well on development of new competence in the library staff.

In short: A number of constraints, pressures and developments call for rather dramatic changes if the academic library shall survive in the long run.

The developments in scientific publishing

Commercial publishers and scholarly societies are implementing new technologies in their productions processes and services. During the past few years all the major publishers have, on a large scale, produced electronic editions of their scientific journals. A number of new journals are only available in electronic format.

Publishers, database producers, subscription agents and other intermediaries are already marketing their own "integrated electronic libraries" - many of these targeted and tailored towards the end user. These products have the potential of bypassing the academic libraries; some of the producers won't even deal with libraries! Some publishers offer discounts to customers who go for electronic journals only. This pricing strategy aims at eliminating the print edition in order to save costs in the future. What we are witnessing here is a dramatic change in production processes and services. These changes require investments on a significant scale from both producers and customers.

Furthermore, an increased co-operation and competition among publishers, database producers, agents and other intermediaries is taking place. Co-operation, in the sense that publishers offer bibliographic data to database producers in order to increase the demand for their electronic full text journals. At the same time a restructuring of the publishing industry is taking place, often leading to mergers resulting in job redundancy operations.

There is no sign whatsoever that the same processes of restructuring will not happen to libraries as well! It is foreseeable that, if academic libraries want to survive as institutions, they will have to change their production processes and services, as well as that the competition - and co-operation - between libraries and indeed co-operation between libraries and publishers, database producers, agents and other intermediaries has to increase.

Taking advantage of developments in scientific publishing

The proliferation of new technology applications in scientific publishing and library and information services and especially electronic journals constitutes of course many problems and challenges for academic libraries. But most important also the opportunity to cope with the most important problem: the escalating pricing of information resources and indeed the cost of processing and transforming these products into user services.

At this point I would like to add that I consider the ongoing discussion on the pricing of scientific journals to be too narrow. There is no point in focussing on the pricing of journals without considering the whole picture of expenses related to providing information services based on print or electronic journals. If library and information managers really want to develop new services based on electronic journals one have to take into account all expenses involved. There is a tendency to forget that the handling of the print journal, due to the paper technology is a very costly operation involving a lot of staff costs not only in the initial inclusion of the journal but also on a continuous basis (shelving, reshelving, checking in and out etc.) not to mention the expenses in library building and maintenance.

The launching of electronic journals, the purchase agreements and consortia options offer new opportunities in developing modern library and information services with a whole new cost structure. Academic libraries may be able to render services based on electronic journals at a lower cost than what is the case of print journals.

There are a lot of savings to be encountered when library staffs do not have to cope with the print issues and the numerous tasks connected herewith. The cost savings indeed will not only be in the traditional technical services but as well in customer services. When users are able to access a critical mass of resources from their desktop the workload of the customer service staff will begin to reduce (fewer loans, overdue notices, and less photocopying).

The plan for re-engineering the library services

In order to really cope with the current problems and to take the necessary measures in redirecting the library and information services the DTV management in May 1997 drew up a plan for the discussion on the library board.

The main points in the plan were as follows:

> Concentrated efforts in bringing services and a *critical mass of content to the users desktop* – i.e. the acquisition of a critical mass of electronic journals and developing an easy to use common user interface to as many resources as possible.

Changing internal work procedures in order to pave the way for *going for electronic journals only* – i.e. not handling the print copy wherever possible.

Reducing staff accordingly – i.e. making 15% of staff redundant, thus saving approx. £ 300.000 yearly.

Investing in necessary hardware, *building large document server systems and developing the common user interface* to databases and electronic full text journals.

Initialising an institution wide *in house training programme* in order to secure remaining staff to be competent in new work procedures associated with handling electronic journals etc.

The plan was approved by the library board in June 1997 and was approved by the university board in September 1997. The administrative procedures as to the redundancy operations was run shortly after the decisions and the 13 staff were announced out of their jobs by May 1998 (incl. 6 months notice).

Developing the common user interface to databases and electronic full-text - the integrated article database service

The development of DTV´s common user interface to databases, electronic tables of content and full-text journals called DTV´s Article Database Service (DADS)[1] was all ready underway. Thus this part of the plan was just an emphasis for faster development of the contents of this service. A pilot service was launched for the university early 1998.

One of the major tasks as a consequence of the plan was approaching relevant publishers and scientific societies in order to negotiate license agreements. During late 1997 DTV took the lead in Denmark in establishing consortia on electronic databases and journals. From early 1998 to date a number of license agreements are in place – for instance consortias have been established with different groups of Danish/Nordic libraries on Elsevier, Springer, Academis Press, Kluwer, IEL etc.

Licensing electronic journals is not a new task for DTV as we were one of the earliest subscribers to the Elsevier Electronic Subscription Service (from January 1997 approx. 300 Elsevier journals have been loaded at DTV). From the outset these data were integrated with a local loading of the INSPEC database as well as the electronic tables of content of approx. 2.500 journals from SwetScan. These data sets were the contents of the test system. Since then this service has been developed further. Some 7.000 additional electronic tables of contents have been included as well as all journals from SIAM, Springer, Academic Press, MCB, Kluwer and the IEE/IEEE Electronic Library (approx. 500.000 documents) have been added. The system is probably one of the world largest integrated electronic services based on a single library. Today it is already a very important part of our service to the university users.

Due to the establishing of a number of consortia a significant increase in journal titles are available from vol. 1995 onwards. This of course gives savings in document delivery operations, ILL-operations, customer service etc. and thus contributes to the expected results of the re-engineering plan.

Staff reductions

The most controversial part of the reengineering plan of course was the reduction of the staff by 15%, that is every 7th staff member were to be made redundant. It is important here to underline, that the management repeatedly has emphasised, that academic libraries especially in the world of today are in severe competition with other actors and that the academic library therefore has to change themselves continuously. Due to a long tradition for organisational changes, changes in tasks and very good relations between the management and the shop stewards the process of planning the reductions were performed in a – the circumstances taken in consideration – decent manner. A replacement agency was involved in the process of qualifying the staff involved in getting other jobs, which was the case for a number of the redundant staff in fact before they were due to be out of their current job.

Of course no matter how well the process of staff reductions is performed it will have considerable effects on the organisation to reduce the staff as much as it was the case here. Nevertheless the economic impact of the reductions was the prerequisite for the changing of priorities and the deliberate enhancement of the electronic services. In a way what we did was to cash in the savings beforehand, thus creating the financial foundation for licenses and development of electronic services and large document server systems.

Human resource development: The JULIA-project - developing new skills and competence, domestic PC´s and distance learning

During summer 1997 DTV undertook an institution wide in house training programme for all categories of staff. The aim of the project was to secure that the transition from the primarily paper based library services to primarily electronic based library services was a direct process where the staff was trained in the new procedures associated with the handling of electronic resources.

The project – called the JULIA project[2] - had as one of its major features in outlining the work processes relevant for the handling of electronic journals throughout the library. Those work processes that were to replace existing work processes based on the handling of the paper editions.

A number of work processes were to be eliminated in the transition from handling paper journals to handling electronic journals.

More important though was the specifications of the new or more correctly added qualifications that there were to be in place in order to the staff being able to cope with the new tasks. Very quickly it became obvious that the single most important task of the transition was to see to, that all staff were very competent on the general management of information technology applications, embracing not only general office automation software (as for instance Microsoft Office), but as well E-mail, WWW-publishing, Internet searching etc.

In order to secure the fastest possible upgrading of staff competence in general information technology applications the decision was made to lease personal computers and install those in the homes of all staff. The personal computers and all telecommunication expenses are paid for by DTV. The primary educational initiative has been to offer to all staff to take the so-called PC drivers license, which is an approved certificate. The majority of the staff is currently in this process. The education takes place as distance education facilitated by the domestic PCs.

Furthermore a large number of short in-house training sessions has taken place. The sessions has been initiated, planned and processed by the staff not as a master education plan but more or less on demand.

An important spin off of these deliberate investments in development of staff competence for the electronic library has been a major shift in staff attitudes. It is now beyond discussion that the individual staff has her own responsibility in keeping up to date and prove herself valuable for the institution.

At the same time a restructuring of the internal organisation took place. Key features here are flattening the organisation, further delegation of decision making and responsibility. The results so far are, that initiatives from the staff are proliferating and that the entrepreneurial spirit is widespread in the organisation.

Major service improvements – doing more and better for less
The development towards the electronic library or more correctly the hybrid library at the DTV has of course been underway before the reengineering plan was approved, but the implementation of the plan has been a major boost in this process. In the course of one year we have managed to break the vicious circle of zero growth funding, escalating pricing on scientific journals, cancellations etc. and significantly increased the number of journal titles provided to our customers and as well increased the accessibility.

A major side effect of the process has been a university wide agreement, where the vast majority of the 33 departments at the university have agreed to cancel departmental journal subscriptions and transfer the payments for those subscriptions to DTV, in order to let DTV renew the subscriptions - if necessary (a lot of duplicates have been existing).

Furthermore the university management has recommended as a policy, that journals ought to be subscribed as electronic only, where ever possible. This will have great impact on subscriptions from year 2000 editions. Preliminary feedback from the university departments indicates that they as from year 2000 will go for electronic only. As from 1999 DTV has cancelled paper editions of the 300 Elsevier journals and the same is the case for journals from Academic Press.

As indicated this has all ready resulted in considerable savings and more savings are to come in this combination of centralised management of the purchasing and handling and decentralised services, where thousands of journals are accessible from the users desks 24 hours a day 7 days a week.

The overall results of the process have been a significantly rise in profile of DTV internally at the university and elsewhere. As a matter of fact researchers from the university increasingly are informing us that their colleges at other universities are approaching them in order to know more of their services. Late 1998 this has had the effect that two departments from another university have signed up on DTV services and in May 1999 2 Danish universities have entered an agreement with DTV on access to the system. A number of Nordic universities are seriously considering coming onboard. This will of course develop extensive user services at all involved sites and sound economic foundations for the operation and development of the system.

Lessons learned
If the library management really can convince the staff that the academic library is in dire straits and in severe competition with publishers, intermediaries and indeed other academic libraries, and that things therefore really have to change, then one of the primary prerequisites is in place for changes that are much more than incremental.

For years now the library management again and again has emphasised, that we have to look at the developments outside the libraries and prepare for radical changes in order to survive as an institution. But the end of the 90`es the overall majority of our staff has adopted this point of view and are working together with management in order to secure that the radical changes are being brought into action.

These rather considerable changes in staff attitudes are of course partly obtained due to deliberate investments in further education, extensive in-house training and lately distance learning activities facilitated by the domestic PC programme offered to all staff. Furthermore we have more or less eliminated traditional borders between different categories of staff as to who are allowed to perform which tasks. Flat organisations and cross-departmental teams really must be supported and developed.

These developments at the human resource side are one of the crucial prerequisites for a successful re-engineering. No matter how advanced your systems are it will not help you a lot unless your staff are competent and ready to learn all along the process, without having to cope with resistant attitudes etc.

Incremental changes do not apply if academic libraries are to keep up with the demands for new and adequate services. In general I consider libraries much too little risk taking and too much caring of doing everything for everybody. For me it seems pretty obvious that academic libraries cannot continue with the present level of ambition in the print or paper world and at the same time develop a critical mass of adequate electronic services. We must choose in which of the directions we will invest the majority of our financial and human resources.

At the DTV we have chosen to go as much as possible for developing modern and easy to use electronic services, and this of course to a certain degree at the expense of the traditional services. Cancellations of print editions in bulk have begun, as from 1999 and from 2000 this will be very extensive.

All though we have not asked the users we have received considerable positive feedback both as to the daily services but as well politically from university decision-makers.

Perspectives for academic libraries

What is missing so far is a more widespread entrepreneurial attitude in the library community. If the academic libraries do not more actively involve in the new developments the risk is that other players on the scene will take over. The widespread take oversee, mergers etc. are sufficient evidence that the traditional roles in the distribution chain are blurring. Publishers, database producers, agents, aggregators and indeed libraries are taking up each other roles and due to traditions and predominant attitudes the academic libraries could easily be the losers in this process[3]

In the course of the last 2 years a number of new roles for the academic library are emerging. Today it is really difficult to state, whether DTV is an academic library or as well operating as a consortia builder, license administrator, aggregator, systems- or service provider etc.

However the common denominator of these activities is the vertical and horizontal extension of the core competence in the library and information profession: knowledge management.

Besides that there are a number of other areas where this competence can be brought into action. Just to mention a few: Supporting the necessary development in university teaching and learning processes, creating communication infrastructures for students and teachers, establishing systems, facilities and services for the virtual classroom etc.

In short: there are a lot of opportunities for an entrepreneurial approach to the management and development of academic library services. It indeed is possible to tackle those challenges the academic libraries are confronted with these years, provided that management are prepared to go for more than incremental changes.

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INTELLIGENT ACCESS TO DOCUMENT ARCHIVES

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INTRODUCTION

Researching information has always been a crucial problem both in the area of paper and computer documents. Thanks to the Internet explosion, an enormous amount of information has been made readily, easily and economically accessible to users. Progress is being made in the existence and the use of information technology in libraries. Up to the beginning of the '90s information technology was used in libraries only for automating traditional library functions: purchases, cataloguing, catalogue consulting, lending, statistics, etc. Information technology tools have evolved, from mainframes to servers. Client-server architecture has asserted itself and so have graphic interfaces. All this has shown it was necessary for traditional library tools to evolve. Even the consulting techniques within libraries, which were traditionally limited to the material owned and kept in the library, are changing. It is now possible for users to refer to and possibly process information found not only in the material owned by the library, but also found by accessing the net. The multimedia or virtual libraries make it possible to manage documents in a differently than before. This new organisation gives the end user a new angle on the resources available in libraries. The end user is no longer a passive consumer of documents, but an active researcher. The contents of the virtual library come from documents, which, in turn must be available for access from any part of the organisation. The new systems for accessing information make use of Artificial Intelligence models and methods. They are capable of creating *user models* that allow the system to adapt itself to the characteristics and needs of the specific users of the system. Information filtering systems are interfaces located between the information source and the user. They can determine the relevance of a document by comparing it to an explicit model of the user's information interests.

These systems base their modelling activities on a dynamic classification model of the user by means of a series of stereotypes. Besides gaining some knowledge, the system is also able to infer data to obtain new knowledge from the one contained in the model. An information filtering system based on user modeling means that the user need not read all the documents provided by the source, but only the potentially interesting ones. While reading a document, the user can express an opinion on its relevance, which makes it possible to adapt the model to the subjects that in time, the user seems to appreciate or not appreciate. In this paper the methods and models capable of creating user models and of filtering information, in order to contribute to an intelligent access to document archives, are presented.

SEARCHING IN A DIGITAL LIBRARY

Libraries exist in many forms and are of many types. In computing, code libraries have been a part of the world of software engineering. With multimedia technologies we now have image libraries, audio libraries, and even digital video libraries. We might also think of libraries when we refer to collections that now reside in databases, knowledge bases, text bases, or the World Wide Web (WWW).

The phrase "digital libraries" evokes a different impression in each reader. To some it simply suggests computerisation of traditional libraries. To others, who have studied library science, it calls for carrying out of the functions of libraries in a new way , encompassing new types of information resources ; new methods of storage and preservation; new approaches to classification and cataloging. To many computer professionals, a digital library is simply a distributed text-based information system, a collection of distributed information services, a distributed space of interlinked information, or a networked multimedia information system. The digital libraries are seen as the space in which people communicate, share, and produce new knowledge, and also as support for learning.

In order to make effective use of any kind of electronic information, as found in a digital library, the organisation and manipulation of information by content is a crucial component.

Several projects aim to improve user information seeking by closely coupling text search with visualisation methods to display the result of the searches [1], other projects allow users to directly manipulate data. Today's digital libraries that depend on WWW are increasingly able to take advantage of the fruits of human-computer interaction research.

In the following will be shown as the application of user modeling technology to information filtering improves the usability and usefulness of the WWW.

USER MODELING IN INFORMATION FILTERING

The WWW has emerged as a new type of information space. Its lack of central control mechanisms leads to many new interesting features but at the same time has the potential danger that users can drown in irrelevant information. Being lost in space and overloaded with information [2] are two problems users confront: there is more information out than a single user can manage. The potential benefits of the WWW will not be realised if users cannot retrieve information easily and efficiently. The principal techniques that have long served users to retrieve information are browsing and searching. Selective search becomes critical because formulating queries to retrieve the desired information is difficult and requires considerable skill; for example, the use of search engines in the WWW is not standardised. New strategies are needed to deal with information space such as WWW: users need active support to determine if potentially information exists, where the information is located, how to retrieve the information when it is located. To satisfy these needs the users need selection systems that can be easily manipulated to match their personal interests. Belkin and Croft [3] compared two major methods for information selection: filtering and retrieval. For effective filtering to occur, accurate information about both the document space and the user must be maintained. An important part of an information filter is a user model to predict what a target user would you like to filter. Information filtering is based on profiles that describe either individual or group preferences. Such profiles often represent long-term interests of the user.

Several applications are focused on developing products that are based on user modeling to improve the filtering and interactive search experience in Web-based environment.

A user model is a knowledge source which contains explicit assumptions on all aspects of the user that are relevant to the interactive behaviour of the software application. These assumptions concern aspects such as the user's knowledge and interests. A user modeling component, on the other hand, is the part of the software application whose function is to incrementally construct a user model; to store, update, and delete entries in this model; to maintain the consistency of the model and to supply other components with assumptions about the user. User modeling shells are general user modeling components that may provide a representation scheme for assumptions about a user's beliefs and interests, an inference mechanism for this representation, a mechanism for detecting inconsistencies in the assumptions, a belief revision mechanism, etc. Such a shell can then be filled with domain specific inference rules as well as with domain- specific default assumptions about any user, and then be integrated into a software application. The most well known user modeling shells are BGP-MS[4], GUMS[5], TAGUS [6], UMT[7].

User modeling technology (UMT) has also been integrated into information filtering system. The IF-UMT (Information Filtering based on UMT)[8] presents a prototype system developed in an project on the application of the UMT shell to information filtering. IF-UMT aims at providing user-oriented information filtering to users accessing Internet services. Others information filtering systems content-based are the following: Amalthea[9], Letizia[10], PROFILE[11], SIFTER[12], WIFS[13].

In the next section an experiment of the system WIFS (Web-oriented Information Filtering System), carried out to evaluate user satisfaction, will be illustrated.

AN EXPERIMENT AT ENEA

The system WIFS uses an approach for user modeling based on stereotypes[14]. A stereotype is a description of a prototypical user of a given class. A case-based approach[15] for the task of automatically inferring user stereotypes is used. Moreover an artificial neural network is implemented. This hybrid architecture has been tested and compared to some traditional approaches[7, 5] and it has proved to be more precise[13]. The filtering algorithm assigns a score to each document calculated as the similarity between its representation, the user model and the query.

An experiment at ENEA (Italian Agency for Energy, New Technology and Environment) was performed in order to evaluate and compare the performance of WIFS with standard information retrieval techniques. We have tried out several tests to determine the efficacy of using an information filtering system based on user modeling methodology.

Seven experts working at ENEA in different topics of the environmental domain, have scored a set of documents obtained by each query session of WIFS. Each user started with the preliminary interview managed by the system. As next step, each user input 15 queries, then personally analysed all filtered documents and gave a relevance feedback (value between –10 and +10). After each filtering process the relevance ordering of the collection is obtained. A statistical results demonstrate that the WIFS improves the performance of Alta Vista by more than 30% both in precision and recall and in the ordering capabilities.

CONCLUSIONS

The use of systems based on Artificial Intelligence methods and models, capable of creating user models and of filtering information, greatly contributes to an intelligent access to document archives and offers a valuable support when building intelligent digital libraries. Introducing these advanced systems will open important prospects in libraries, as they will facilitate the promotion and production of the cultural heritage they possess.

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IATUL

MANAGEMENT OF ELECTRONIC INFORMATION

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Introduction

The management of collections of electronic information resources raises a new set of issues for libraries, but these issues can still fit within the classical theoretical framework of collection development and management. Electronic information resources still need to be selected, acquired, catalogued, made available, and preserved, but in radically different ways from traditional print materials. The type of collection management issues raised by electronic information resources will, of course, vary between libraries depending on their individual missions. These issues cannot be addressed in isolation from print resources, and libraries need to begin to develop integrated collection policies for print and electronic resources. In this context, the role of the collection manager is vital in developing policies and structures that will integrate, across print and electronic media, the tasks of discovery, location, request and delivery. The skill of the collections manager will be to create collections which balance the best features of print and electronic resources, and which make them work together effectively in the interests of the library user.

Electronic information resources

Electronic information is a broad term that encompasses abstracting and indexing services, full-text materials such as newspapers and reference books, electronic journals and the offerings of electronic 'aggregators', article delivery services and free resources on the Internet. These electronic information resources can be accessed via electronic networks from third party information providers or mounted locally within the institution or within the library. There is also a growing corpus of digital research material produced by scholars as part of their research, but it is too early to say how libraries will manage access to this material. Therefore, this chapter does not attempt to address the significant collection management issues of this type of material, which are more properly being addressed by such bodies as The Arts and Humanities Data Service (AHDS) [1]. To explore the collection management issues that arise, it would be best to begin by examining the types of electronic information resources that are now available to libraries. Until relatively recently, electronic information resources referred to the library's provision of an online searching service of bibliographic databases, mounted on a host service like Dialog or STN. Online searching was usually mediated through a subject librarian, and in general users of the service were charged for the direct costs of the search. The responsibility for the overall management of this service usually lay with the public services staff of the library and this service did not raise any collection management issues. In the mid 1980s, some libraries began to provide self-service electronic information services by subscribing to the CD-ROM versions of online databases. Access was usually from stand-alone or networked workstations, but a few libraries added self-service online databases, mainly in the business area, and usually on a subscription rather than pay-as-you-go basis.

Bibliographic databases

At the beginning of 1991, there was a step change for UK higher education libraries in the provision of electronic information, when the university funding councils launched the BIDS (Bath Information and Data Services) ISI service. BIDS-ISI provides staff and students in subscribing institutions with free site license self-service access to the main ISI databases: *Science Citation Index, Social Science Citation Index,* *Arts & Humanities Citation Index* and *The Index to Scientific and Technical Proceedings (ISTP)*. Access to these datasets is generally managed by the institution's library, and the datasets are made available 'free at the point of use' to staff and students in subscribing institutions. These datasets had long existed in electronic form, even though their output had been in print, and so this enabled users to be provided with long back-runs of information, which helped the rapid take-up of the service. The effects of this initiative, have been 'truly revolutionary' [2] for academic libraries. The initial access to the ISI datasets tested the viability of the model of providing UK-wide access to networked bibliographic datasets and the success of the model led to a rapid expansion in the range of datasets. The number and range of networked datasets has increased substantially since 1991 and there are now over 40 major national dataset agreements in place for UK higher education. Most of these datasets are electronic versions of what had been printed abstracting and indexing services and were held by many libraries. Therefore as the datasets provided access to material which has traditionally been the province of libraries, they, rather than computer centres, took the lead in managing and funding these networked datasets. However, in spite of the increasing availability of networked datasets, CD-ROM still remains a popular medium for electronic resources, and increasingly for reference materials, and it is a medium which is particularly attractive for those institutions with an underdeveloped IT infrastructure. In 1996 academic libraries subscribed to 535 individual CD-ROM titles [3] and while many libraries continue to subscribe to the CD-ROM versions of bibliographic databases, there is a move towards network access to remote hosts, wherever practical.

Electronic journals

As staff and students became familiar with the BIDS bibliographic datasets, there has been an increasing demand for the full-text of the journal articles themselves, rather than just the pointers to them. However, full-text electronic journal services are still in their infancy with most major publishers only now experimenting with limited services and libraries do not like investing in experiments. Rather they prefer to be able to provide their users with reliable and supported services. In 1995, the funding bodies established Pilot Site Licence Initiative (PSLI) with the participation of four publishers - Academic Press, Blackwell Publishers, Blackwell Scientific, and The Institute of Physics Publishing. The aims of the initiative, which was to run for three years, are to explore the issues around providing access to a critical mass of electronic full-text journals; to test a national site licence concept for electronic journals between higher education institutions and publishers; and to provide libraries with a discount on the existing subscriptions to journals published by the participating publishers, so that they would consider subscribing to more titles. PSLI provides access to the full-text of over 250 recent journals from the four publishers, but one of the problems associated with the PSLI was that it was publisher-led rather than subject-led; and users do not in general approach information by publisher, but rather by subject. However, the initiative did stimulate libraries into embracing electronic journal developments earlier than they might otherwise have done, and did highlight some of the collection management issues that arise from mediating access to full-text journals. 'Libraries that might otherwise have been slow to develop have been forced to embrace electronic journal developments, and library staff and users have been able to become familiar with and benefit from new services' [4].

In general, the initiative is a welcome learning experience for most libraries on the issues involved in managing collections of electronic journals, but the lessons learnt are necessarily limited, as it was initially to be only a three year experiment. Most respondents to the evaluation noted that it was not possible therefore to make long-term decisions on cancelling those print journals that were now being made available in electronic format. They considered that there is a need for greater certainty about the future of the scheme, for the technology to be stable, and for the archiving issues to be resolved before some would commit themselves to a shift from paper to electronic. Of course, the initiative was not just for the benefit of librarians, but was intended to improve access to the full text of journals for the users of libraries. Where libraries were able to obtain feedback from users, it was generally very positive. This was particularly the case with the physics community, who are in general comfortable with IT and saw the initiative as particularly relevant to them, as it was led by a specialist physics publisher - The Institute of Physics

Publishing. The scheme is to continue and be expanded beyond 1998 under another title - National Electronic Site License Initiative (NESLI) - but on 'full cost recovery' and without any funding from the higher education funding councils, but it is too early to speculate on the future take-up of the Initiative by libraries.

Journal aggregation services
Full-text electronic journals are, of course, not confined to the PSLI, but many individual publishers are now making full-text electronic journals available, but only of recent issues. This is leading to an increasingly confused environment for libraries with the different access methods and licences being offered by each publisher. Before committing on a major scale to providing users with access to the full-text of electronic libraries, there is a need to balance the benefits against the costs of managing these individual services. In anticipation of a market demand, a number of organisations, often subscription agents, are establishing journal aggregation services for publishers. These services provide simplified and integrated access to a range of electronic journals, in the same way as subscription agents now manage the supply of printed journals. Journal aggregation services include Blackwells Electronic Journal Navigator [5], SwetsNet [6], and BIDS Journals Online which

> "offers access to over 58,000 full text electronic articles from an expanding range of more than 450 academic journals from publishers such as Academic Press, Gordon and Breach, Arnold, Blackwell Publishers and Blackwell Science. Full text access is available generally to subscribers only, though some articles may be ordered individually using account or credit card facilities". [7]

There are also subject-based aggregation services such as *European Business ASAP*[8], which provides Internet access to the full text of over 200,000 articles from over 100 business and trade publications. The advantages of these new full-text aggregation and subscription management services are the same advantages that are provided for libraries by the management of printed journals, having one source to deal with for subscriptions, receipt, claiming and payment. For electronic journals the advantages claimed by aggregation services include the management of password distribution, license administration, managing access, archiving, and recording use of titles. The alternative to this one stop 'supermarket' approach, where users can find all the electronic journals metaphorically on the shelf and available for use, is the 'boutique' model with a multitude of isolated hand-crafted publisher sites, which users may or may not discover. One of the keys to the take up of these new services will be the number of publishers that an aggregation service can sign up, and how quickly each service can build a critical mass. In the meantime, most libraries are waiting for the market to mature and for one of the services to emerge as the market leader before subscribing.

Internet resources
Libraries are increasingly considering if and how to provide access to relevant Internet resources for their users, but any move into this area should be addressed as part of the library's overall collections policy for electronic resources. Most libraries mount pages on their institution's CWIS, which not only describe the library's services, but include pointers to relevant Internet sites [9]. A library can attempt to manage and add value to the Internet in this way, in the same way that it manages and adds value to other information resources. But the same principles, and management overheads, that apply to developing and managing collections of printed and 'paid-for' electronic information resources, also apply to a library's collection of free Internet resources. There is a need to define the scope of the collection, to allocate collecting responsibilities and to ensure that mechanisms are in place to maintain the collection and review its effectiveness. The alternative strategy, which may be more cost-effective than developing local collections of Internet resources, is to provide pointers to existing external subject gateways, such as EEVL, SOSIG, TipTop etc. [10], and then to fill in any gaps locally. In the Internet environment, there may be a need to regulate or restrict access to information, which contrasts with the traditional role that libraries have always

had of aiming to improve access to information. Restricting access to 'unsuitable' Internet sites can be dealt with by software 'nannies', which prevent access to designated sites, but it is usually dealt with by the university's regulations. As libraries now house clusters of networked workstations, they can be in the front line of enforcing any institutional access restrictions. They need therefore to ensure at the drafting stage that the regulations are enforceable and establish guidelines for how their staff should deal with any problems that arise.

Collections development policy

There is now such a wide range of electronic information resources available to libraries that selection decisions should be made within an explicit collection development policy. 'Selection of electronic resources outside the guidance of a collection development policy leads to haphazard unfocused groupings of resources that may or may not support the mission of the library' [11]. An explicit collections policy will at least prevent the library from being driven by events or by individual enthusiasms and from purchasing a random set of resources which it then cannot support. A collections policy will also help the library to head off the inevitable resistance to change from within the institution. There is considerable room for debate as to whether libraries need, for example, a separate collections policy for electronic resources, as libraries do not need a separate collections policy for oversize books. However, most libraries are still in their infancy as regards providing access to electronic information and therefore need to proceed in a measured and structured way by isolating the collections management issues of electronic information. In time, as print and electronic resources reach more of a balance, a fully integrated collections policy will be appropriate, but that time has not yet arrived.

There will always be some resistance to moves away from the comfort of printed resources into the uncertain world of electronic resources, and the library has therefore to make sure that it does not appear to move too fast for its users. It is important that any major move into electronic resources is presented within the institution as being part of an agreed library strategy which has at least some degree of institutional support. A more subtle approach can be taken by labelling 'innovations with conservative titles; encouraging users to think that major changes are merely minor modifications to existing practice; claiming, if you can, to be reverting to traditional procedures which may, more recently, have been corrupted by less worthy successors' [12], but this will depend on local circumstances.

At the broadest level, a collections policy for electronic resources would deal with subject coverage by, for example, aiming to support all the major research areas with the major bibliographic databases, or it may be that the library wishes to be selective and target some specific subject areas in order to effect cultural change. The selection policy will address information formats and their technological implications both for the library and the institution. It will also address the management and staffing issues of supporting electronic resources. Whatever is in the policy statements, they have above all to be flexible and will need to be interpreted sensitively within the context of local needs, priorities and culture. A research-led university is more likely to concentrate on providing the major bibliographic datasets which match the subject profile of the institution, whereas a university which has teaching as its primary mission, is more likely to concentrate on providing access to full-text services on CD-ROM. In an ideal world, this collections policy would be part of an institutional Information Strategy [13], which aims to place the management of library mediated information resources, both print and electronic, in an institutional context. However, few institutions have yet developed a full information strategy and few libraries have the luxury of waiting for this to happen, so on the principle of 'the best being the enemy of the good', libraries often have little option but to proceed in a policy vacuum.

One of the major considerations to be addressed in the collections policy will be balancing user wants and needs for electronic information resources. It is well understood that an academic's first demand for additional library resources will almost always focus on more print journals. The surveys undertaken in 1995 by Ehrens showed that when academic staff were asked what improvements could be made to their institution's library that would be of most benefit for their own area of research, by far the main priority was to have an improved journal collection [14]. Fourth on the list, after improved book and research report collections, was better access to external electronic databases. This raises questions of does the library know best about the information needs of its users and should it attempt to lead or to follow its users.

Selection

'Choosing among formats, identifying what is available, analyzing costs, understanding licences and other legal concerns, interpreting service implications, considering preservation, preparing equipment and facilities, and developing local approaches for acquiring, cataloguing and processing electronic resources introduces new challenges' [15]. On the face of it, the selection criteria for an electronic information resources are similar to those employed for the selection of print resources - does it meet the information needs of users and does it represent value for money? Selecting an electronic resource is not as straightforward as selecting a printed resource and involves a large number of additional issues apart from the appropriateness of the information content of the resource. As the detail of the selection criteria is developed, there needs to be a check-list in place which identifies the range of issues that will need to be brought to the decision-making. Johnson [16] suggest the following set of particular considerations that should be addressed when selecting electronic resources, once a decision to purchase is likely:

- network, hardware and software compatibility;
- availability of network, hardware and software resources;
- availability of electrical and telecommunications lines;
- quality of interface (ease of use for library users and staff);
- quality of retrieval/search engine;
- training implications;
- potential use (size of user community and frequency of use);
- reliability of vendor and availability of vendor support;
- availability of documentation;
- licensing considerations;
- treatment of graphics, formula, and other non-standard characters.

It is vital to ensure that full ownership of decisions to purchase is taken by all the stakeholders in the library, and there may be a need to establish a standing committee/working group on electronic resources with wide representation, in order to co-ordinate selection decisions. It is important to be aware that the process of acquiring, delivering and supporting electronic resources involves staff from all parts of the library, including systems, acquisition, cataloguing, preservation and reader services. When resources are selected, the ability of the library to provide and support access and the capability of the user to access the resource need to be considered before a decision is made, and such a decision will need the support of all relevant sections of the library. Selection decisions cannot therefore be taken without reference to the library's technical staff to ensure that the infrastructure is adequate and that there is sufficient expertise to provide technical support for the new dataset. There also needs to ensure that the public service staff are not only aware of new datasets but also have the necessary skills to support users. 'Basic techniques such as checklists, careful planning and systematic procedures for the introduction of new services support the sense of professionalism among staff who feel inadequate in the eyes of users when new services appear to be run chaotically' [17]. Much of this can be addressed in advance of purchase as, given the higher relative cost and service implications of electronic resources, libraries can usually arrange a trial of a new major electronic resource. A trial will ensure that not only the quality of the data and its presentation can be assessed, but also any access and support issues can be identified in advance of purchase. This is also a good moment to involve users in the decision-making process and to assess their reactions to the dataset during the trial period.

Collection management

The daily management of electronic information resources present enormous opportunities and challenges for all library staff, but also involve significant management overheads, including licensing negotiations and monitoring, equipment provision and support, training and awareness costs. In particular, the staffing implications of each move into electronic resources needs to be thought through, particularly the possible need for new staff skills. There is a need for a combination of a relatively high level of technological and information skills to be combined in at least one person, and many libraries have addressed this challenge by creating a new post of Networked Information Services Librarian. While all library staff need to acquire new skills in the use and promotion of electronic resources, this type of designated 'hybrid' information professional post is becoming increasingly common in libraries.

The effective provision of electronic information is often hindered by outmoded institutional structures. There is a need for the active and willing support of other academic services, in particular an institution's computing services and ideally this should be within an accepted organisational structure. However, there is often a clash of organisational cultures between libraries and computing services [18] and it has been implied (usually by librarians) that libraries have a service orientation, while computer centres have a product orientation. There may also be personal incompatibilities and it has been suggested [19] that librarians and computing staff are like oil and water: unable to mix or work together. These characterisations are based on stereotypes, but if the information needs of staff and students are to be met, it is vital that libraries and computer centres find effective ways of collaborating. Of course, the remit of a central computing service will also vary from institution to institution, as will the organisational structure for the library and other support services. If the library and the computing service are operationally 'converged' under the same management structure, it will be infinitely more straightforward to provide effective and managed access to the whole range of electronic information resources [20]. If the two services are independently managed, then there will need to be negotiation to establish a harmonisation of priorities between the two services. However, the computer centre is only one of the stakeholders in this game and there will often be a need to negotiate with computing staff in academic departments. If the remit of the central computing service stops at the 'front door' of an academic department, then the library will also need the active support of computing staff in each academic department to ensure that access to networked information resources is indeed pervasive across the institution. The first requirement will be for an adequate network infrastructure within the department, and each member of staff will need to have an adequate networked workstation on their desk, together with the necessary software and support. The library will therefore need to ensure that, as part of its collections policy for electronic resources, that it develops good relationships with a very wide range of service providers across the institution.

Collection evaluation

Libraries, as a service, have always been concerned with measuring their performance in meeting the needs of their users, and of ensuring that the resources they select are of use to their clients. In recent years, interest in performance measurement has been intense. This has been partly due to pressure on resources which has led to a more focused search for efficiency of operation, together with a concern for the needs of users which has focused libraries on addressing measures of effectiveness. There has also been pressure from funding bodies for a demonstration of value for money and, at the same time, users of the libraries services have become more demanding. These pressures were recognised in the Follett Report [21], which recommended the development of generally accepted and reliable performance indicators for UK higher education libraries. However, the concentration had been on measuring the performance of a library made up of essentially local print collections, but many of these measures are not applicable to measuring the performance of the library in an electronic environment. There is a need for 'the development of robust management information and performance measurement systems for electronic libraries' [22]. The CERLIM study highlighted the problems:

> "Electronic services are increasingly being delivered to the desk-top, outside the library and possibly off-campus. User may no longer require the services of either expert library staff, or access to a physical stock of materials to make effective use of 'library' services. In these circumstances:
>
> - library staff may not know who is using which service, and may be ignorant of alternatives which users find for themselves;
> - it is very difficult to know how much use is being made of the services provided by the library;
> - the effectiveness of services is difficult to judge."

The report identifies new performance indicators that are suitable for use in the management of the electronic library. One of the central issues identified in the research was the need to focus on the impact of electronic resources on the user. 'Staff and students in academic institutions make extensive use of electronic information resources, but we do not know which services are of the greatest value [23], nor how one service compares with another, nor, to any great extent, what it is about a service which gives it value'. It is important therefore that a widely applicable tool-kit of performance measures are developed and tested for library managers to use in developing their own local electronic library.

IT infrastructure

It is paradoxical that the promise of extended access to information that electronic resources holds out is accompanied by significant problems of providing that access. As the range and format of electronic information resources increases, libraries are dependent for the delivery of their services on a robust IT infrastructure, within the institution, and both nationally and internationally. Until recently, libraries could operate in a relatively technically self-supporting way within their institution, only requiring the support of institution's computing service to provide and manage the campus technological infrastructure and the connection to the Internet. However, once a library has made the decision to provide their users with access to electronic information resources, it is taking on a continuing commitment to ensure that both it and the institution sustain an adequate technological infrastructure to allow this access. The exact nature of the IT infrastructure requirements will, of course, depend on the method through which the information resource is to be delivered. If the resource is to be installed on a stand-alone CD-ROM workstation, then the requirements are relatively simple and within the capability of most libraries to set up and manage. Many libraries have now moved beyond stand-alone access to CD-ROM datasets and have networked these datasets, either within the library building or across the campus. Managing CD-ROM networks requires considerable technical input, and a continuous source of funding to develop and expand the network. Many libraries are now finding that they cannot guarantee to not have the necessary expertise in the library, nor the funds to be able to upgrade periodically both the hardware and software on the network. They are therefore moving to host access to datasets such as that provided by Silverplatter's ARC service, which frees the library from having to manage their own network infrastructure. If the library is to provide access to networked datasets, then it will need to also rely on a robust local and national network infrastructure and sometimes on robust and responsive international network links. Even though the 'fat pipe' between the UK and the USA is being continually upgraded, use quickly overtakes capacity, and a library therefore needs to consider the practicality of subscribing to US-based databases, when afternoon access can be painfully slow.

The increase in electronic information resources has moved the responsibility for providing print copies from the library to the user, though the library still has a service obligation to try and ensure user access to printing facilities. The growth of electronic information resources is leading to an increased demand for printing facilities, and failure to provide adequate printing facilities will be seen by users as a diminution of service. Printing requirements will range from needing prints from a CD-ROM dataset, to wanting the full-text of an article in an electronic journal, including colour graphics. The library might meet the first need by providing free dot-matrix printers for each stand-alone workstation, but the staff costs in managing and supporting this facility need to be considered. Alternatively, the library may require the user to download the information from the database to a floppy disk and take the disk elsewhere for printing. More sophisticated printing requirements, which may require a networked Postscript printer, cannot usually be met by the library alone, but will require an institutional infrastructure that supports the provision of network printing facilities. The cost of obtaining, supporting and upgrading local equipment has therefore to be considered within the collections policy, but often the cost can be met from other institutional budgets, as it can be made available for other uses.

The growth in the provision of electronic information resources is also having an impact on the planning and use of library buildings. Tables need to be bigger to accommodate computer workstations, space needs to be provided for printers and for the essential distribution equipment, and lighting, noise levels and environmental conditions need to be addressed [24]. These issues are, of course, best addressed in the context of designing a new building, but most libraries do not have this luxury and must attempt to adapt existing buildings to newer uses. A library's electronic collection strategy for may therefore be significantly influenced by the extent to which the library building can provide the necessary IT infrastructure and can be made hospitable to new uses.

Access

User interfaces
The question of how best to provide access to each electronic resource has to be fully considered and there is a need to build easy to use and integrated interfaces to electronic resources, which can be supported and updated. Most libraries manage access to networked information resources through their Web pages [25], but if a library wants to provide its users with a fully integrated collection of resources, regardless of the media in which they are available, then ideally there should be one point of discovery and access to the resources [26]. For example, information on both the print and electronic resources that the library subscribes to could be via the OPAC, with the added benefit of providing a 'single-click' access to the text of the electronic resource. In the same way, integrated access to Internet resources could be provided, and some libraries have even gone so far as to fully catalogue Internet resources and provide access to them via the OPAC, though many doubt the scalability of such an approach. The practicality of using the OPAC for integrated access will, of course, depend on whether the library has a Web-based OPAC, and it raises issues of how access to the OPAC should be managed. If the OPAC has become, in effect, a networked PC that provides unrestricted access to both the Internet and networked datasets, then there will be a tendency for users to spend a lot of time at the OPAC, rather than just quickly finding the classmark of a particular book and leaving the terminal for the next person. An unrestricted network PC also raises network security issues, as it has no audit trail and allows 'walk-in' users to freely use those datasets to which access is regulated only by IP source address.

Training and support Users still lack the confidence that electronic resources can be adequate substitutes for print resources which, in their eyes, are always physically available throughout the opening hours of the library. The speed at which individual subject areas move towards using electronic information resources will vary considerably and will not only be influenced by the availability of datasets, but also by the prevailing 'computer culture' in the particular academic department. Reluctant users are ready to see complicated and sometimes unreliable technology coming between them and the information resource, and they are often willing therefore to trade the convenience of desk-top access for the perceived reliability of physical access. However, there is now a general acceptance among most members of the academic community (though each institution will have pockets of resistance), that electronic information services will have a considerable impact on their work and that these services will improve as time goes on. Many staff are unaware of what is available to them and what a particular resource could do for them. There is a need for awareness and support activities at a number of levels, from raising awareness of the existence of electronic resources, to training in the technology and interface, to providing the skills necessary to make use of a particular resource. The library is only one of the stakeholders involved in promoting the use of electronic resources and it needs to ensure that its promotion strategy is in harmony with other national and local initiatives. The first role of the library is to actively and constantly promote both the awareness of and the use of electronic resources if a return on its investment in these new services is to be realised. This will mean developing a continuing local publicity strategy for electronic resources, which would include the production and distribution of leaflets and guides - both printed and Web-based- providing seminars for researchers, academic staff and undergraduates, running 'show and tell' sessions, and making use of other institutional opportunities. Users often need a new set of skills to make full use of electronic resources and many institutions are meeting this need, at least for students, by providing formal information skills training. This can be on a departmental or an institution-wide basis, and the latter method could be accompanied by certificating a set of basic IT skills. It is important for the library to have an input into this process, at least to ensure that the programme includes the necessary information skills that a student will need to discover and use the available electronic resources.

The library will also need to address how it can provide a help facility for users of electronic resources, especially as most of the usage of these resources will take place outside the library. 70% of BIDS usage is still via VT100, and it is likely that most users will match this 'old fashioned' access method with an 'old fashioned' usage pattern of the databases. They may also be passing these bad habits onto their students when they introduce them to these datasets and the library will need to intervene in this process, but its intervention may not always be welcomed. Many institutions are developing distance-learning courses and one of the major issues for the library is how to support effectively the information needs of users who are not only outside the library, but may be outside the institution. The need here is for the library to ensure that it is involved at an early stage with course designers, so that the practical issues of supporting distance learners can be addressed. There is also a need to ensure that library staff are aware of the range of electronic resources to which the library subscribes, and are aware of the level of support that they may be expected to provide. New skills will be required from library staff [27] if they are to provide the integrated support that users of electronic resources expect, and more and more libraries are setting aside a weekly 'training hour' when the library is closed for staff training. However, awareness and understanding does not begin and end with the library staff or the users, but it also involves the other support staff in the institution, together with the institution's senior management, who all need to share in the library's vision.

Copyright

'Electronic media present new challenges to copyright holders...Copyrighted material converted into digital form can be copied perfectly without any damage or diminution in the quality of the original' [28]. Electronic copyright is an uncertain area, but one where the establishment of an easily understood legal framework is needed in the interests of publishers, users and libraries. Although the Dearing Report [29] on higher education recommended to the government that copyright law be amended to give teachers and researchers easier access to digitised documents for research and study, the government has since indicated that it does not intend to change the law at present. However, if progress is to be made in building functioning electronic libraries, it is vital that the uncertainty over the use of digital material is removed. Publishers are naturally concerned that unregulated access and 'seepage' of their machine-readable data over the Internet might affect the level of return on their investment in publications. They fear that their business is threatened if permission is given to users to copy and then widely distribute materials that they have invested in to create. They wish therefore to regulate the use of their information by erecting barriers to the storage and access of their information, which contrasts with users who want to download material, annotate it and forward it freely to others. Digital copyright is, of course, an international and a wider European issue [30], but there are now a number of initiatives in progress in the UK to address the issues. JISC and the Publishers' Association have been working towards developing a set of agreed guidelines on digital copyright clearance and on digital inter-library lending, and on developing 'model licences' for the use of digital data [31]. Libraries are caught in the middle of all this activity and have the task of 'imposing rules set down by the law which may bear no resemblance to the realities of fulfilling demands from staff and students' [32]. Librarians are used to dealing with the regulation of print copyright and they can act as honest brokers in the electronic environment, if they can convince publishers that they can create a controlled environment within their institutions that provides protection for rights holders.

Licencing
The usage of datasets is usually regulated by licencing arrangements, whereby the supplier leases the data to the library and its 'authorised users' make use of the it, subject to a set of conditions. For example, CD-ROM databases can either be licenced for single use on a stand-alone workstations or for multiple use on a CD-ROM network, with a significant price difference between the two. Licencing conditions may also be so complex that there can be a need for the library to consult an institution's legal advisers on the terms of a licence before it is signed.

There are a number of ways in which a supplier might regulate access to an electronic networked product. It can be by individual or institutional password, or by password plus IP source address, or by institutional IP source address alone, or even by institutional sub-nets. In the latter example, access to a dataset would be restricted to network calls originating only from within the subscribing site, and so a user might only be able to access the dataset if they are physically within the institution and so within its network 'domain'. As higher education institution move towards off-campus learning, which may be promoted to potential students as providing the same learning experience as on-campus courses, students will then expect the same access to networked datasets from both on- and off-campus. The discussion needs therefore to centre more on 'group' or 'community' licences, rather than simply 'site' licences, as the physical location of the user is often not the key membership criteria. In the above example, access can be dealt with by ensuring that off-campus students access the dataset by first connecting to the campus network and then to the dataset. If this is required, the library will need to convince the computer centre of the importance of the issue and negotiate with them to ensure that they support the local and national dial-up facilities are in place [33]. However, some dataset providers will only allow password access to their information, regardless of where the network call originates and while this method is easier to manage, it requires the library to organise the issuing of passwords, and for the user to remember yet another id and password. All these access restrictions, which will inevitably vary between datasets, will have to be managed and mediated to the user by the library, and this constitutes a considerable management overhead and possible bar to use. It is also possible that each dataset could have separate licence terms and one of the fears of librarians is that they will have to negotiate different licence agreements with, for example, each journal publisher. With over 15,000 journal publishers, this is clearly not practical. There is a need therefore for a model set of licence terms to be agreed and this is likely to be one of the outcomes of the discussions between JISC and the PA, at least for the UK.

When 'authorised users' is defined as the staff and registered students of the institution, it can mean that access cannot be provided to external or 'walk-in' users of the library, unless it is specifically negotiated with the data supplier. Many libraries have actively marketed their services to the local business community, or they may have a science or research park on the campus, where access to the university library is promoted as one of the benefits of locating on the park. A significant move into electronic information services will therefore represent a decline in the information resources that are available to external users. This contrasts with the ability of external users to make unrestricted use of printed material in a library, once they have been granted access. However, even if the site licence can be extended to such users, there is the problem of how to gain access to the database, as this will in most cases be via the campus network, which is usually only available to staff and registered students.

Authentication and authorisation
By taking out a licence for a dataset, a library has also taken on the responsibility for ensuring that the terms of the licence are adhered to, and for ensuring that only authorised users access the data. For a network resource, this may involve authenticating the user, prior to authorising them to have access. Authentication can be defined as the process whereby a network user establishes a right to an identity (or

possibly multiple identities), and authorisation is the process of determining whether a particular identity is permitted to access a resource. Libraries have observed that one of the major deterrents to the rapid and pervasive take-up of electronic information resources has been the variety of authentication and authorisation mechanisms in use, and therefore the number of user ids and passwords that have to be learnt and remembered. In order to address this issue, JISC has recently funded NISS [34] to develop and manage a national centralised authorisation service, based on institutional authentication. The new service - ATHENS - is intended to provide a single sign-on, with the same username and password, to all JISC-funded datasets and provide a transferable model. ATHENS has been designed to meet the needs of both the user, by providing easy access to datasets, but also to protect the needs of the resource supplier by providing strong safeguards on the security of the data. When ATHENS is in place, and all existing JISC dataset users have been provided re-authenticated, libraries should find that one of the major access barriers to networked electronic resources has been removed.

Archiving and preservation

One of the central issues relating to the licensing of networked datasets is whether the institution will have continuing access to the backfiles of the data after the licence has expired. With a print resource, a library presently retains the books and journals that it has purchased, and users of the library can access the backfiles of a printed journal even though a current subscription may not be held. This contrasts with most licensing models for electronic resources where no guarantee of continuing access to back files exists, once the subscription has lapsed. Most libraries have taken the decisions to maintain data in only one format, and , for example, as the ISI datasets became available through BIDS, libraries generally cancelled their printed or CD-ROM versions of the Citation Indexes. When the BIDS-ISI deal comes up for renewal, a library may decide not to renew its subscription or ISI may decide not to licence the datasets to BIDS, but to direct potential subscribers to its own access platform at a price beyond the capacity of the library to pay. In these instances, the library would have nothing to show for its ten years subscription to the datasets and it will need to address such issues in its collections policy. It might not be necessary to have perpetual real-time access to the dataset, but the library should have the confidence that by paying a subscription over ten years, it has *acquired*, rather than *borrowed*, the dataset for its users.

As libraries build up local collections of digital resources, they will have to address locally the issues of archiving and preservation of the data. Research libraries and archives have taken on the responsibility for archiving and preserving selected printed material as part of their collections policy, and scholars can be reasonably expect to access preserved scholarly material that was published in printed texts over the past four of five centuries. Scholars also need to be confident that digital material produced today will be accessible for future generations and the academic library community has now begun to address this responsibility. However, it needs to be remembered that digital data is simply a sequence of bits, and retrieving a bit stream requires a hardware device, such as a disk drive, and technology for reading the physical representation of the bits from the medium. It also needs a software program and operating system software to interpret the bit stream, as most files contain information that is meaningful solely to the software to run these programs. There will therefore be a need to save the programs that generated the digital documents, as well as the system software to run those programs [35]. The speed of technological change is so fast that the past few years are littered with obsolete technology and with information resources that are unreadable - most libraries can remember the Microcard collections of Parliamentary Papers or the BBC Doomsday Project.

Digital preservation is beyond the ability of most libraries or publishers acting individually, though libraries need to move 'higher up the food chain' to ensure that they have an input at the data creation stage into the implications for long-term preservation. One of the eLib Phase 3 projects, CEDARS, aims to address the strategic, methodological and practical issues involved in the long-term preservation of digital information resources and to provide guidance for libraries in best practice for digital preservation. The project deliverables include:

- guidelines for developing digital collection management policies which may ensure the long-term viability of any digital resources included in a collection;
- demonstrator projects to test and promote the technical and organisational feasibility of the chosen strategy for digital preservation;
- methodological guidelines developed by the demonstrator projects providing guidance about how to preserve different classes of digital resources including detailed advice about appropriate storage media and back-up strategies and data formats;
- analysis of the cost implications of digital preservation.

The results of this and similar projects will provide a framework for a library's digital preservation and archiving collection policy, and help academic libraries decide where they wish to place themselves on this access to holdings continuum.

Finance

Budgeting

Electronic information resources raise a new set of financial issues for the library's collections policy. The first requirement for the library is to find the money to pay for new electronic resources, (including VAT), often in a context of a stable or shrinking budget. In this situation, money for new services can only be found by reallocating or redirecting existing funds, when the demand for traditional services is continuing to grow. As a budgeting principle, it is as well to remember that electronic information resources are more rather than less expensive than print resources, and networked resources are more expensive than stand-alone ones. Unfortunately, this is often not recognised by university management, as the over-vigorous promotion of the concept of the 'virtual library' has led them to assume that it is already here, and that 'common sense' dictates that it must cost less than a print library. A library's existing budgeting traditions will, of course, have a significant effect on the extent of the provision of new electronic information resources. If the bulk of the budget is 'devolved' to departments or faculties, with little 'top slicing', and most of the decisions on purchasing are made by academic staff, then it is likely that there will be few electronic resources available through the library. If such a library is keen to provide leadership in electronic library developments it may need to employ subtle, or even slight-of-hand, budgetary strategies to increase the range of electronic resources. This would contrast with a library where control of the spend rests with the library and where the library staff will be able to meet users' needs (rather than wants), even before they know they have them.

> "Our studies indicate that those libraries which have developed a policy dynamic relating to the provision of information services as a whole, are generally higher than average providers of electronic services...a feature of the management of such libraries is the degree of autonomy awarded to them by their parent bodies." [36]

Consortia Purchasing

One of the recommendations of the Follett Report [37] was that national and regional strategies governing library provision for researchers across all subjects should be developed by the funding councils and other bodies. In 1994, the Anderson Committee was established to follow up this recommendation. Although much of the subsequent report is concerned with the provision of printed resources, there is an acknowledgement that electronic resources should form part of any national strategy. However, the report acknowledges that 'it is unlikely that an electronic approach to comprehensive research provision, despite its undoubted attractions, will offer a feasible base for a research strategy at least in the shorter term, even for journals' [38]. The approach may therefore be through local or regional consortia. Most higher education libraries now belong to a consortium, e.g. CALIM in Manchester, the M25 Group in London [39], and

SCURL in Scotland, and some of these groups are investigating the consortium purchasing of library materials. The usual starting point is to jointly tender for the supply of printed journals, with some consortia now beginning the process of tendering for book supply. When it comes to the joint purchase or licensing of electronic resources, most of the negotiations are undertaken on a UK-wide basis, but some consortia have been in discussions with publishers of electronic sources to explore the possibility for sharing access to resources among members of the consortia. For example, one of the major journal publishers has approached consortia to discuss a framework for providing access to all the electronic versions of their titles to all members of the particular consortia, whether they subscribe to the print version or not. The terms presently attached to the deal, particularly the non-cancellation stipulations, have been unacceptable to most consortia, but it is an indication of how libraries can begin to hunt in packs and obtain financial advantage [40]. However, the significant issues of authentication and access management, that will make this vision of cross-organisational access to networked information resources a reality, have yet to be fully addressed.

Pricing

The financial model that has been used for access to JISC datasets has been based on a flat-rate subscription to each dataset for each institution, regardless of size of institution. This flat rate model could be equated with the model of subscriptions to the printed versions of the dataset, which has a fixed price regardless of the amount of usage. The charging model also included a reduced fee for early sign-up and required a commitment for a period of five years. An alternative model would have been to use a tiered subscription rate or a pay-as-you-use model of access, and the latter could be equated with the model of access to online databases. Although the flat-rate model could be described as a crude mechanism, any variation based on size of institution or usage would have led to endless discussions on the accuracy of the data, and the flat-rate system at least had the advantage of simplicity. Library managers like to operate in an environment of predictable costs, and this is why the subscription model of dataset charging adopted from the beginning for JISC-funded datasets has been favoured by almost all libraries. This model worked reasonably well when there were only 70/80 reasonably homogenous higher education institutions. The removal of the binary line, which had divided universities and polytechnics, increased significantly the size, diversity and missions of higher education institutions, and this has led to pressures for changes to the charging model. The flat rate pricing model was perceived to disadvantage small institutions, who might wish to access the dataset on a pay-as-you-use basis, and the five year subscription period also created difficulties for libraries who are unable to make such long term commitments. After a review of the options, the funding model adopted from 1998 [41] will be one of differential charging for each dataset. There will be between three and five tiers of subscription, and institutions will be placed within tiers by a set of criteria reflecting institutional size, the nature of the institutions relative to the nature of the dataset and specialist factors, such as the presence or otherwise of relevant academic departments. This should now make it easier for smaller libraries to develop collections of electronic resources, but will now involve all libraries in developing strategies to optimise their placing in the subscription tiers for each new JISC dataset.

There are still a wide variety of pricing models used by commercial information providers and it is likely that most of the present models will be unsustainable in the long term. In general, access to the electronic version of a journal is only permitted by a publisher as long as the print version is subscribed to by the library, either for the same price or plus a supplement. Many journal publishers are therefore charging current print price *plus* electronic surcharge *plus* significant projected inflation surcharges, for simultaneous access to the electronic versions of their publications. Libraries are also being asked to support the cost of a publisher's research and development programme. These pricing models are preventing most libraries from establishing strong collections of commercial electronic journals, beyond those provided through the PSLI. Before such pricing practices (which can be print *plus* up to 90%) become the norm, there is a need to develop, preferably in partnership with publishers, new economic models for the pricing of electronic information products. Libraries acting alone cannot influence publishers and therefore these pricing issues need to be tackled internationally through such initiatives as the International Coalition of Library Consortia (ICOLC) 'Statement of Current Perspective and Preferred Practices for the Selection and Purchase of Electronic Information' [42]. The Statement, which has already been endorsed by consortial representatives from a number of other countries, addresses wider issues than just pricing and includes contract negotiation, data access and archiving, system platforms, licencing terms, information content and its management, and user authentication. The Consortia argue that as 'publishers today increasingly act globally to provide electronic information, it is incumbent upon libraries to act globally to express their market positions on the pricing and other terms and conditions related to the purchase of that information'.

The future

It is already clear that the provision of electronic information resources does not necessarily lead to a reduction in the use of printed resources and there is unlikely therefore to be a withering away of the physical library, at least in the foreseeable future. On the contrary, electronic information has contributed to a significant growth in the use of existing printed resources, and a rediscovery of the printed journal literature as bibliographic datasets act as indexes to the library's collection of printed journals. It has also led to an increase in the demand for inter-library loans, as users became aware of the range of print literature that exists outside their local library through the use of electronic bibliographic datasets. Most libraries have now introduced rationing of inter-library loans either through charging or by allocation.

Libraries will need to develop mature economic models for the provision of electronic information, so that they can make meaningful comparisons between the costs of print and electronic. It is too simplistic just to compare only subscription costs, without looking at the life-time costs of the different delivery options. While a library will need to provide the necessary shelf-space for print resources for which it will not have to fund, the electronic version will require an investment in an appropriate IT infrastructure, which the library may have to fund. Ideally a library manager should be able to have a set of the management tools to compare all the costs of electronic versus print, or access versus holdings. With the move towards desk-top access to information, it is becoming irrelevant to the user where the information is located, either within the library or across the world. The trick for libraries will be to provide, through access, the same reliability of service as they have traditionally provided through holdings, and this requires the development of new economic models. MA/HEM [43]is an example of a software product which is intended to allow libraries to make such comparisons and to help them in evaluating alternative strategies for the provision of information.

Libraries are still in their infancy when it comes to providing access to electronic information resources, but as the majority of the information resources that libraries manage become electronic, they will need to re-engineer themselves and redefine their roles [44]. One of the major changes in higher education which will affect libraries will be an increased role in supporting student learning [45], and in providing managed access to electronic courseware and electronic learning resources, including both 'electronic course readers' [46] and locally on-demand scanned material. Many institutions are therefore re-badging their libraries or investing in new 'Learning Resource Centres', where the management and provision of electronic information and learning resources will be a major activity. At the same time as the library provides increased support for student learning, there could be a decreasing role for the library in support of researchers, as information providers direct their services at the end-user over the network. Publishers will soon be able to provide sophisticated metadata searching facilities to ensure that users find the information that they want and this will be supported by secure online payment facilities to manage the delivery of the information. If the trend of devolved institutional budgeting continues, then researchers are increasingly likely to have control of their own information budgets, with a consequent weakening of the central role of the library in this new electronic environment. On the other hand, it is likely that libraries will have a role in managing and preserving locally and nationally produced digital resources, such as electronic theses and other 'raw' research material. However, all these developments are still at an early stage, but they do raise a whole new set of issues about the nature of 'collections' and their management, which are outside the scope of this chapter. There is no doubt that librarians with skills in collection management will need to be involved in defining this future if they are to provide the seamless access that our users need. To achieve this effectively librarians will need to expand their roles and become 'knowledge managers', rather than simply 'collection managers'[47].

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CHALLENGING TECHNOLUST: THE EDUCATIONAL RESPONSIBILITY OF LIBRARIANS

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None of the three levels of formal education—primary, secondary, tertiary—has really grasped the implications of a world which has a surfeit of data and information, or of the impossibility of sustaining lifelong learning in the 21st century without information literacy—the understanding and capacity to recognise the need for information, to identify, access and find the needed information, and then evaluate and apply it.

What formal education, politicians and governments have tended to grasp is the glittery but slippery straw of information technology, at great cost and to date with little demonstrable educational return on investment. At the same time those very agents—libraries, teacher librarians and librarians—able to provide leadership and substance in dealing with the complexities and issues of the information age, have at best received modest recognition and investment. At worst they have been deemed to be obsolete or irrelevant. This is despite the fact that librarians were among the first to recognise the potential for information technology, especially the web, to extend access to information resources and enable scholars to display, find modify and store information. They were also very early in learning how to use and evaluate web resources. Their obsolesence is as implausible, if not more so, than the demise of the real, as opposed to the virtual, university. However, regardless of the proddings, mainly by librarians, about information literacy as the key issue for education in the 21st century, governments, politicians, and educational institutions are generally failing to take the issue seriously, despite its societal, economic and democratic consequences. There has been a massive misjudgment that the key educational issue of the information age is information technology, rather than information literacy. The consequences of that assumption have been evident for some time.

For example, in 1996 Reuters published *Dying for information? An investigation into information overload worldwide*, and in 1997 *Glued to the screen: an investigation into information addiction worldwide*. These confirmed business people were experiencing high levels of information anxiety. The 1998 Reuters report *Out of the abyss: surviving the information age* reviews the responses of 1,072 company executives in eleven countries, developed and less developed. It concluded

> … that while information overload is still a severe problem for many across the globe, different countries appear to be at different stages in the information development cycle.
>
> What we are now witnessing is the emergence of a new era of the information age where individuals and businesses are rejecting multiple sources of information in preference to a single source that they believe will actually give them all the information they need. While the quantity of media and content continues to proliferate, a sea change in the way in which we consume and manage information is becoming perceptible. It is a question of survival of the fittest, because increased financial constraints and the threat of recession mean that companies increasingly require the right information at the right time. Those who learn quickly how to harness the power of information for competitive advantage will set a standard of information management that others will follow. Those who don't will still risk falling into the overload abyss

> of stress, confusion and poor productivity. [1]

Eighty one per cent of respondents felt that schools should do more to prepare children to deal with information. *In other words, to become more information literate.* Of equal interest would have been their response to the questions 'How did your university education prepare you to deal with information' and 'Do you consider yourself information literate ie able to recognise the need for information, to know how to identify, locate and access the needed information, and evaluate and apply it?' They are questions suggested to Reuters for its next survey.

Technology in education

To set the educational scene, an excellent paper produced in 1998 by the Centre for Education and Change at Deakin University in Australia, entitled *The new information technologies in schools: making plans or having options*, is drawn upon.[2]

Although this working paper focuses on schools, its observations and conclusions apply to higher education. For example, that 'Although reluctant to admit it, schools are clearly caught in an increasingly expensive pattern of consumption of high technology products'. Universities are caught in a similar pattern, a pit of expenditure for which no bottom is in sight.

This pattern of consumption means that in the US, schools purchase about 500,000 pcs a year, although, as elsewhere in the world, it appears that as schools spend more on technology, they spend even less on training teachers to use it effectively. The glitz of the technology is what impresses parents. Working out how and what to use the technology for often takes second place. The Blair government in the UK is intending to spend £1.7 billion in a 'computers for all' effort in which schools, colleges, public libraries and corporations are being enlisted to build a dynamic IT and T industry. And in Australia the various state governments are in the process of spending as much as a total of $2.8 billion on school computers and infrastructure with the general aim of ensuring that there is at least one computer for every five students in government schools. Some private and government schools already exceed that level of provision. For universities worldwide, calculation of the total expenditure on educational information technology, infrastructure and maintenance would confirm that it is large, and growing.

The technolust dream

All of this expenditure is the dream come true for the technolusts of this world. What, and who, are these technolusts? The Deakin University study identifies four discursive fields concerned with the information and communication technologies and education. These fields are given the labels of *Booster (Technolust), Antischooler, Critic* and *Doomster*. Each discourse, explicitly or implicitly, points to a future, although not to longer term conclusions because proponents or opponents seldom adopt

> ... the art of the long view. The working paper suggests therefore that those involved in changing education and those being changed by education should understand the future of each discourse rather than accept uncritically its promises and prognostications and blindly take up its imperatives.

Boosters (or Technolusts)

These are by far the noisiest group. They:

- are unequivocal promoters of information technologies in education
- their pronouncements are easily found in the media and are rarely questioned by journalists
- Bill Gates is a major leader
- have an unswerving faith in the technology's capacity to improve education and most other things in society
- consider the duty of teachers and lecturers is to make the best use of these technologies as if they all

have intrinsic educational value
- rarely challenge the educational claims made on behalf of technology
- the technology is seen in terms of replacing inefficient human activity. Such replacements are unproblematic
- have a faith in finding a technical solution to any educational problem, including those problems produced by using technology itself
- rarely interrogate their own privileged positions with regard to access to hardware, software and the expertise in using it
- display no awareness of the lessons of history or concern for the fallibility of technological prediction
- believe there will be no problems in terms of equity and access since the technology has become so affordable and available—the fact that web usage is growing disproportionately in some groups is of no concern.

Yet as Dellit points out 'the dominant paradigm of the web is the marketplace and … capitalism thrives on inequality. The web is therefore a vehicle of inequality by definition.' [3]

Technolusts, of course, have existed for a long time, have often been confounded by events and usually fail to recognise that one technology rarely completely displaces another. In this context I am reminded of an observation by the president of the Libraries Board of South Australia, made in 1937 when the State of South Australia had no free public lending libraries. He said that 'Other countries are now paying dearly for free libraries, which are meeting with much the same competition'. [4]

The competition to which the president referred was 'the wireless', 'modern enlarged newspapers and magazines, and talkies (movies) with their never ending sessions'. The result he said 'is that books have to take a second, third and fourth place where formerly they were the first'.

In 1999 that president could probably add the internet, video shops, super bookstores, amazon.com, computer games, cell phones and satellite and cable television to his reasons for not funding a public library system accessible by all citizens regardless of their circumstances. He was wrong in 1937 - he would be equally wrong in 1999, and in 2099.

Antischoolers

These are a subset of the technolusts. They use their analysis of the relationship between institutional educational and information and communication technologies to propose the demise of institutional education itself.

They tend to the view that putting computers into educational institutions is like putting an internal combustion engine into a horse.

Antischoolers

- conceive a utopian, high technology educational future, with no educational institutions at one extreme
- may see educational institutions as supporting a monolithic and restrictive curriculum model of education compared with what the internet can offer
- they are critical of top down command systems of educational bureaucracies and large institutions
- argue that as businesses become more concerned with the production and distribution of knowledge they will became unwitting competitors to educational institutions which have been unable to adapt to the demands of technology based change
- the home will be a key site for delivering entertainment and information

- easy access to broadly based digital information will be sufficiently commonplace to allow, if not trigger, the decline of formal education
- there will be no schools
- universities will be reduced to small, highly specialised, privately subsidised research institutes
- just in time online lifelong learning is a high industry, delivered to students at any time anywhere
- teachers become private tutors who work for individual, or consortia of, students education is totally negotiated

The critics
This diverse group is critical of the rush to technologise educational institutions and education more generally. It is sceptical of many of the claims advanced for using information and communication technologies in education. It urges caution and draws sociocultural analyses of technological change to support its concerns. Critics

- distinguish between what a computer can do and what it ought to do
- challenge the taken for granted assumptions about the use of computers in education
- have social justice concerns about access to and use of technology and predict information rich and information poor schools and students
- are concerned about the educational minimalism of some technology based approaches to teaching and learning
- are concerned about the technologies as technologies of control by the state over educational institutions
- turn givens of technolusts into uncertainties, or raise questions about the assumptions underlying their proclaimed benefits
- reject the comparison of learning outcomes that purportedly derive from the use of different media
- argue that technology amplifies some ways of knowing and diminishes others
- argue for a more balanced assessment when computers are to be employed in any situation
- see technology as a resource for learning but also as a context for learning and about which learning must occur
- are not simply negative but are constantly alert to the difficulties, dilemmas and dangers

In Australia, at the end of 1998 the major national newspaper *The Australian* entered the debate. One commentator, a critic (Bigum 15 December 1998) observed

> The end of the millennium and the enthusiastic promotion of new information and communication technologies makes for a heady climate in which to make predictions about education in the new century.
>
> Since the commercial availability of affordable computers some 20 years ago, schools have been subject to predictions of impending revolutions, most of which are little more than unpaid industry public relations. There is nothing wrong with telling ourselves stories about how the world will be. But it is equally important to ask about the critical assumptions that underpin such predictions.
>
> The demise of schooling as it is practised has been a consistent prediction by some. The assumptions that typically underpin this prediction are based on limited understandings of the social adoption of technologies. They make crude equivalences between information delivery and teaching. They ignore the enormous infrastructure and investment associated with schooling, and demonstrate poor understanding of schools as powerful social technologies.
>
> I believe that when we take out the industry promotion factor, the disputes around these technologies in education reflect generational differences. John Perry Barlow talks of immigrants and natives, of two different mindsets, of one group (natives) that has grown up with this technology, and has understandings and insights that are generally unavailable to the 'immigrants', for whom these technologies were invented after they were born.
>
> As we (immigrants) move from out initial infatuation with these technologies and learn to understand that technical solutions to complex social and economic problems need to be taken with more than a few grains of salt, we might learn to be more supportive of, and sympathetic to, the generations that will have to live with the decisions we have made and

> will make about computers in education and more generally.

Another commentator, a technolust (Spender) declared in the same issue of *The Australian*

> Every student needs a computer. You can't be a full member of an information society unless you have one. While it might seem a tall order to provide everyone with their own terminal, it's the only way every Australian will have a stake in the information future.
>
> Last century we decided everyone should have access to books, but that not everyone could afford them. So we came up with the public library. This is how we did equality with print. But we are definitely not doing it digitally.

This commentator ignored completely the fact that most Australian public libraries now provide free public access to the internet.

Many letters were received, mostly from parents and mostly critical of the technolust position. The newspaper's editorial (14 December 1998) concluded

> The maxim that children need computers at school is a marketers' dream, tapping the fears and hopes of parents and the desire of governments to appease them. Research and experience are yet to identify whether or how children learn different and important cognitive skills by using computers. Perhaps early exposure simply gives them a confidence and comfort with new technologies that will stay with them for life. Until adequate research can provide a better basis for allocating competing resources, caution rather than panic should be exercised by schools and governments.
>
> When dividing the finite funding pool for education, governments must not be driven by an assumption that technology is by definition the best investment for children. Computers must be examined like, and weighed against, every other educational resource.

Doomsters

These are unqualified opponents of the information and communication technologies and see much damage to society and education arising from the uncritical acceptance of new media forms, ranging from television to the internet. They are closest to the Luddites of 19th century industrialising England, and ask

- why replace perfectly good practices and institutions with technology based ones?
- are concerned at what they see as a deskilling of students who use calculators, spell checkers and other aids
- consider the internet poses important questions about how students are taught to select and judge information from a source in which the quality controls of print based resources do not exist
- consider that what is confused is the amount of information that is available and the amount of information a person can actually use
- see the digerati as the glitterati but as hollow and shallow people tied psychologically to their machines

Doomsters can be found among academic staff in universities. However the reality is that higher education has begun an irreversible transformation, of which information technology is a part. It is also a reality that no study or cost benefit analysis proves conclusively that a significant investment in information technology is worthwhile. Therein, for university administrators, is the unresolvable conundrum. [5]

Librarians: technolusts, anti, critics or doomsters?

As this IATUL conference demonstrates, librarianship is an international profession with core values. In its responses to the above discourse it would have among its individual members adherents of all four scenarios - from those who almost gleefully anticipate the demise of physical libraries and librarians and their replacement with virtual libraries and information professionals, to those who argue that online catalogues are not natural replacements for card catalogues.

The starting point for an examination of where librarians should be in the discourse has to be that

- Librarianship is *not* synonymous with information management—it is much broader in principle, practice and potential

- Librarians are much more than information professionals, however that trendy term is given definition

The next point has to be the values which underpin the work of librarians and libraries. In response to this, Michael Gorman, Dean of Library Services at California State University Fresno proposes [6]

- stewardship
- service
- intellectual freedom
- privacy
- rationalism
- commitment to literacy and learning
- unfettered access to recorded knowledge and information
- democracy

Yet, as Gorman observes 'Every single last one of those values is explicitly or implicitly under attack from those who tout the virtual library, the library without walls, and all the other vapidities of the digerati'. Gorman also notes that, encouragingly, a number of recent publications have begun to question the digital fantasies of the elite. He quotes Michael Noll, author of *Highway of dreams: a critical view along the information superhighway* (NJ, Lawrence Erlbaum, 1997). Noll, a former US Presidential Science Adviser and Bell Labs and AT&T employee states

> … the superhighway is a lot of hype and fantasy, promising services that most people do not want, or are willing to pay for; that the superhighway would by costly to build; that much of the technology exists only on paper and is not real … As you can imagine my critics accuse me of being a Luddite; of having no vision or faith. To them, I say faith belongs in church. I tell them that their utopian vision is old hat and will for some become a financial nightmare.

There has also been a tendency to overstate the threat to higher education, in particular, from global media networks. The lie to this is given in a thorough 1998 Australian study *New media and borderless education* which found that

> While there is a good deal of hype relating to the involvement of global media networks in higher education, there is currently little evidence of this involvement and … little intention of involvement beyond current interests in the carriage of educational content produced and controlled by other providers [7]

These kinds of critique need to be seen in a world context which can all too easily not be part of the consciousness of the privileged, such as ourselves. It is salutary to consider the following observation from Larry Irving, Assistant Secretary for Communications and Information in the US Department of Commerce

> Imagine that we could shrink the world's population to a village of precisely 100 people, with all existing human ratios remaining the same. If we did so, it would look like this: There would be 57 Asians, 21 Europeans, 14 from the western hemisphere (north and south) and eight Africans. Fifty-one would be female; 49 male. Seventy would be non white; 30 white. Eighty would live in substandard housing. Seventy would be unable to read. Fifty would suffer from malnutrition. Only one would have a college degree. No one would own a computer. [8]

The age of information

When the history of librarianship of the last quarter of the 20th century is written two names will stand out for their sanity and their balance in the discourse about the role and future of libraries, for their insistence on distinguishing between new methods and enduring principles, and for contributing intellectual rigour to an educational and library discourse which has not been over endowed with that quality. They are Michael Gorman and Walt Crawford. [9] It is they who have emphasised that only the technolust will be content with an information society limited by the values of governments, and merchants who colonise cyberspace. Crawford, in a 1999 article in *American libraries*, makes the point well when he describes the age of information as a metaphor, an organising principle and an image, and that things go awry when people seize on that image and reshape their views of reality to fit it. He contends that

> Ages are what people make them. Technology works when people need and use it. People don't fit neatly into simple models, but people—in their complex, confusing aggregate—determine which technologies survive, which ones become significant but minor niches, which ones linger on without significance, and which ones sink without a trace.
>
> Libraries serve people. Libraries will prosper in the future by serving people's diverse interests and needs, not by asserting that librarians know what people *should* want and how they *should* acquire information, knowledge, and recreation. People require a mix of analog and digital resources to serve their preferences and abilities; libraries could honor those requirements. [10]

In similar vein, Gorman concludes that

> Change is all about us, in libraries and in the wider world. We are dealing with new ways of doing things, with the incorporation or invasion of technology into all aspects of libraries and their services, and with the psychological dislocation that such pervasive change brings to all of us. But change is just concerned with processes; it is a serial event not the heart of what we are. All the more reason then, if we are to survive and thrive in such a time, to distinguish between the process of change on the one hand and the meaning and values of what we do on the other. We will have new libraries and many of our programs and services will be new and different from what we have known, but our mission remains the same and the values that inform that mission the same. [11]

Libraries and librarians are thus about much more than just information management. This is true of the libraries of educational institutions, it is true of public libraries. It should also be true of special libraries and librarians, even those who persist in using the restricting and short sighted terminology of 'information centres' and 'information managers'. Every library, and every librarian, has an educational role to play. If they do not, they deny their calling and responsibility. This responsibility has never loomed larger because information, writ large, is the currency of society. Librarians see and observe how people come to and use that currency, and to what use it is put. Data and information is also the currency of the internet, and there is no profession in the world better placed or able than librarians to reflect, comment, advise and educate on the rhetoric and reality of the internet and information technology, or to challenge the assumptions of the technolusts—assumptions which at best may be naive and at worst may be dangerous.

However the reality is that the discourse of librarians about the issue has remained largely within the profession. It is time to move on and enter the broader educational and societal debate from a position of confidence about the values, knowledge and insights librarians have. To use a 19th century image, the educational horse has to be placed firmly in front of the technology and information management cart.

There is no use in librarians attempting to assert their educational understandings and role if this is not the explicit core of their public mission statements. Teacher librarians in schools have had this for many years; librarians in community colleges often do so; yet librarians in universities are often still equivocal about asserting their integral educational role and wisdom. What they still tend to emphasise is their role as academic support agencies, efficient information gatherers and managers, and access providers.

A recent trawl of university library websites for their mission statements (mainly in English [12]) confirms this (the name of the university has been excluded).

For example, from *Australia* we have

- To provide quality information services and resources to enhance the University of …'s national and international standing as a place of excellence in teaching, learning and research

- To achieve excellence in the provision and promotion of information services to meet the research, teaching and learning needs of the University

- To support research, teaching and other activities of the … University by provision of effective educational media services and by making available relevant and accurate information in all forms and as fast and efficiently as possible

- The Division of Library Services contributes to and supports the University's pursuit of excellence in teaching, research administration and community service by offering a full range of university library, archival and art curatorial services

- Developing and delivering client focused information and technological services that enhance …'s educational , research and community programs

- To provide and enhance access to published information in print and non print formats which supports the University's overall mission, specifically its research, teaching and education programs and its regional, national and international responsibilities in library matters

- We bring people and information together to enhance teaching, learning and research within the … community

- We link people with information, enabling The University of … to achieve excellence in teaching, learning and research

- The University Library has a threefold mission to provide quality information services and resources to support:
  - learning through … University courses
  - research and independent study by University students and staff, and
  - activities in the wider community
- The mission of the … Library is to provide, either by local acquisition or retrieval from remote sources, all forms of recorded information in selected fields pertinent to the goals of the University of … and to make them available to members of the … community engaged in teaching, research, study and community service

- To be the University's key facilitator of information access for student centred learning, research and information literacy

In *New Zealand* five of the seven university libraries have mission statements on their home page

- The Library participates directly in the University's commitment to teaching, research and the development of new knowledge by
  - providing the University community with equitable access to information and recorded knowledge
  - acquiring, organising and making available information resources appropriate to the University's educational purpose
  - teaching information skills to all library users as the basis for lifelong learning
  - promoting information services in a manner which reflects the distinctive character of the University
- The Library aims to provide an effective and properly managed information resource for the teaching, learning and research needs of all members of the University of … and thereafter the wider community

- The Library is the University's key access point for information and recorded knowledge in support of current and anticipated teaching and research. The Library selects, acquires, preserves and provides suitable study environments for its users. Library staff assist in providing access to information and knowledge and training in information literacy skills

- The mission of the University Library is to be the primary gateway to global information resources for the University of … community, providing customer service support for scholarship, learning, teaching and research by accessing information and teaching knowledge navigation

- To maintain through the provision of library facilities, collections and services of the highest quality a learning environment supportive of excellence in both teaching and research

In *The Netherlands* most university libraries have an English version of their home page, but out of the sixteen university libraries, only one has a mission statement, in Dutch

- De bibliotheek vormt de kem van een nieuwe organisatie die in de Universiteit onderwijs en onderzoek ondersteunt. Zij heeft een flexibele instelling in een continu veranderende wereld en is expertisecentrum voor het opsporen, verwerken, opslaan, produceren en verspreiden van informatie

Ze fungeert als een centraal trefpunt waar onderzoekers, onderwijsgevenden en studenten elkaar kunnen ontmoeten en ideeën kunnen uitwisselen in een aangename omgeving

South Africa has five web mission statements

- The mission of the University of … Libraries is to provide information and an effective service in support of learning, teaching and research in response firstly to the needs of the University community and then to the community in general
- We strive to provide information to users through excellent library and information services
- The basic goal of the University of … Libraries is the effective development of library and information services to all sections of the University community to promote the educational, research and service programmes of the University. At the same time the University Libraries recognise their obligation to support the intellectual activity of scholars and students, regionally, nationally and internationally, through their involvement with other libraries and library organisations in view of the unique nature of … library collections
- Through a client driven focus we are the preferred source of academic information services for the University where, in a dynamic environment, skilled and dedicated staff are a guarantee of quality service
- … University Library aims to be an excellent academic library through the provision of ready access to information resources, and by aiding in equipping people for lifelong learning. We are committed to quality user focused service, fairness, innovation and professional integrity

Switzerland has one mission statement, in German

- Die Öffentliche Bibliothek der Universität … ist ein wissenschaftliches Informationszentrum für die Universität und die Region und zugleich Kantonsbibliothek des Kantons …. Sie ist Teil des nationalen und internationalen Informationsnetzes.

  Im Mittelpunkt unserer Arbeit stehen die Dienstleistungen für unsere Benutzerinnen und Benutzer. Unser persönlicher Einsatz und unser Verhalten an jedem Arbeitsplatz der … läBt die Benutzerinnen und Benutzer erkennen, dass sie im Zentrum unserer Arbeit stehen

Austria has one mission statement

- Die Aufgaben der Universitätsbibliothek umfassen
    - Die Beschaffung, ErschlieBung und Bereitstellung aller zue Erfüllung der Lehr- und Forschungsaufgaben erforderlichen Informationsträger unter Beachtung der weitgehenden Kontinuität und Vollständigkeit
    - Die Bereitstellung der Bestände für die wissenschaftlich interessierte Öffentlichkeit
    - Die Vermittlung von Information unter Nutzung weltweiter Datennetze (z.B. Internet) und Datenbanken einschlieBlich der Dokumentenlieferung
    - Die Pflege und ErschlieBung des wertvollen historischen Buchgutes
    - Die Mitarbeit an Gemeinschaftsunternehmen des österreichischen und internationalen wissenschaftlichen Informationswesens
    - Die Kooperation und Koordination mit den anderen wissenschaftlichen Bibliotheken Österreichs und des übrigen Europas

Germany, too, has one

- Dienstleistung für unsere Benutzerinnen und Benutzer ist der Inhalf unserer Arbeit. Persönlich Engagement bei der Arbeit soll die BenutzerInnen erkennen lassen, daB sie im Mittelpunkt und Arbeit stehen.

  Wir unterstützen unsere BenutzerInnen der Universität bei Forschung, Lehre und Studium, auBerdem unsere BenutzerInnen aus der Region in ihrem wissenschaftlichen Literaturbedarf, sich das mit der Versorgung der Universität vereinbaren lästr Als grose wissenschaftliche Bibl sind wir Teil des kulturellen Lebens der Euregio Bodensee

Iceland has one

- The National and University Library of Iceland is a research library which is both the national library and the library for the University of Iceland. The library functions include, amongst other things, collecting and preserving all materials published in Icelandic and serving the needs of teaching and research activities at the University of Iceland

Namibia has one

- The University Library is a pivotal player in the process of education, development and social change. Being central to learning, teaching and research, our primary goal is to meet the information needs of staff and students and to serve as a national reference library

Canada has eleven, out of 38 searched

- The mission of the University of … Library System is to serve the information needs of the University and its communities by providing effective access to information resources within and beyond its walls, through a balance of traditional and innovative services.
- Principally, the Library exists to serve the needs of students, faculty and researchers at the University of … But it is also … primary research library, vital to the economic, cultural and social development of the province
- To play a central role in promoting learning by providing expert and innovative access to information and the world's knowledge to a wide range of users within and outside the University through high quality services and collections
- The Library plans for, makes available and facilitates access to a broad spectrum of information resources and services to support the teaching, learning and research activities of the University. Library services—and the ways in which they are made available—will complement the University commitment to creativity, innovation and excellence. To the extent possible, Library resources and services will be accessible by the wider community.
- Le mandat essentiel de la Direction des bibliothèques est de fournir à la communauté universitaire les ressources et les services documentaires nécessaires à l'enseignement et à la recherche
- The creation, communication, and preservation of knowledge are essential to the academic community. The ... University Library forms as integral part of this community by acquiring, organising, preserving, and providing access to information and knowledge sources, in whatever form or location, to advance the university's instructional, research, and public services goals. The Library is committed to service: its staff share a common purpose and responsibility to provide exemplary service
- The Library will be an essential partner in the research and instructional endeavours of the University of … providing an information infrastructure rooted in a knowledgeable and responsive staff, a sound collection base, and the continuous pursuit of collaborative opportunities to expand access to scholarly information resources
- The mission of the Libraries is to support the University's mission in achieving excellence in the scholarly activities of teaching, discovering, preserving and applying knowledge by
  - anticipating information needs
  - building and preserving collections that support the teaching and research programs of the University, and which emphasize identified University priorities
  - delivering information in a timely fashion
  - encouraging information literacy by educating our community in the use of information resources
- The Libraries' mission is to support teaching, learning and research at the University of … by providing expert and innovative access to the world's recorded knowledge
- The University of … Library contributes to the achievement of the University's goals by collaborating with other members of the University community in teaching, research, learning and service
- The Library's mission is to provide access to information resources and to promote the necessary conditions for their effective use in support of the University's stated mission, which is 'the pursuit of learning through scholarly research, teaching, study, and artistic activity, all within a spirit of free enquiry'

In the *United Kingdom* only nine (including the University of Oxford), from 82 universities and college libraries, have a mission statement on their home page

- The mission of the … is to support the University's mission by providing …
- The Library is committed to enhancing the teaching and research objectives of the University of …
- … aims to work in partnership with schools to
    - support and stimulate the learning, teaching, research and consultancy activities of the University by providing access to the widest range of facilities, resources and systems
    - ensure that services are of appropriate quality, responsive to users' needs and good value for money
- The primary role of … University Library is to serve the members of the University and, as far as resources permit, to meet their needs
- Within the context of the University's arrangement of responsibilities and services, and in support of its corporate objectives, the Library undertakes …
- The Library's mission is to maintain and develop collections and services in support of the present and future teaching and research needs of the University of … and of the national and international scholarly community. In order to carry out this mission, the Library will always aim to …
- The aim of Library and Learning Resource Services is to provide a key element in support of the University's mission as a leading provider of vocationally-orientated higher education. It therefore aims to help the University achieve and maintain the highest educational standards and be a means of providing challenging opportunities and support to its wide and socially representative constituency of students. It aims to enable students to take responsibility for their own learning and help them achieve their full potential and aspire to the highest academic standards. The service also aims to contribute to applied research activity and support University staff in a range of scholarly activities, to a level which supports but does not adversely affect provision for student teaching and learning services.
- The University Library provides library and information services in support of the University's overall aims and objectives, as embodied in the mission statement and strategic plan. Paying due regard to the need for cost effectiveness, the University Library will continue to be responsive to user demand and proactive in the development of services and use of technology
- The Library's mission is
    - the satisfaction from its own resources or otherwise of the legitimate information needs of the members of the University
    - the preservation for the benefit of scholarship of appropriate parts of its collections
    - the promotion of the Library's role in the academic work of the University and of the research community as a whole
    - cooperation with other information providing organisations at local, regional, national and international level
    - provision of access to the information in its stock for other users who are not members of the University
- The Learning Centre sees its mission as contributing to the University's success by providing a high quality service which stimulates student learning and enhances the professional lives of teachers

Lastly, a trawl of about 70 per cent of university websites in *the US* revealed just 32 library mission statements. Significantly, well known insitutions such as Princeton, Cornell, Yale and Columbus, do not appear to have library mission statements. If they have, they are not publicised to the world.

- We are a teaching library. Our vital information resources and skills advance the university community's pursuit, development, and sharing of knowledge
- In affirmation of … State University's mission as … public liberal arts university, the mission of … Library is
    - to provide information resources and services that implement, support, and enrich the academic programs of the parent institution
    - to facilitate the interaction of students and faculty with the ever expanding, increasingly complex information universe
    - to support and assist faculty efforts to instill in students an ability to recognise a need for information, to understand the value of information, and to distinguish between information and knowledge
    - to serve as teachers, mediators, liaisons, advisors, consultants, and partners in the information seeking process

  - to encourage the habit of reading and use of libraries in order to develop the potential for self education and intellectual development for lifelong learning

- The … Library system provides library resources and forward looking information services of the highest quality in a timely, cost effective manner to support and facilitate the research and educational programs of the Institute

- … Library supports the academic programs of … through instruction, collections, technology and services which enable students and faculty to access recorded knowledge and information resources

- This is the mission of the library
  - to provide collections, services, personnel and systems that support the teaching and research programs of the University
  - to organise, interpret, and maintain those collections, services and systems
  - to empower the members of the University community to think creatively, analytically and critically about the utilization of information resources and the acquisition of knowledge

- The Libraries are the primary information centers for individual students, faculty, and staff at … University. Since efficient access to information on a global basis is critical to learning and research, the Libraries are indispensable to the University Mission. Library services and collections play a crucial role in the support of instruction; in scholarly communication; and in expanding information literacy within the university community through direct instruction

- … Library supports the University curriculum and stimulates teaching and learning by providing an environment in which instruction and research can flourish. The library promotes the use of electronic information and instructional technologies on campus and facilitates access to collections and resources worldwide. The library empowers its users with the information and technological competencies necessary to pursue their educational, research, and professional goals. To maintain and extend quality services the library solicits feedback from its constituency and conducts regular assessments. Besides providing service to a diverse campus population, … Library serves as a cultural and intellectual resource for the local community, encouraging lifelong learning

- The … Library participates directly in the purpose of … State University, a comprehensive public university, and serves as an integral part of the educational program of the university. Thus, the mission of the … Library is to provide access to the information resources necessary to fulfull the institution's curriculum, teaching, research, educational and community leadership objectives

- The … Library provides information resources and services to the … University academic community

- The Library supports and enriches the educational and research missions of … State University by facilitating the access, evaluation and use of information resources. The Library supports course integrated instruction and provides personal consultation to help users meet their information needs. The Library also shares information resources with the local, state, national and international communities

- The … Library, in partnership with the … community, creates a dynamic and innovative learning environment that motivates, educates, and encourages individual participation in active learning of information skills and knowledge which leads to success at … and in a global environment

- … Libraries, the mission
  - assist students, faculty, state, community and cooperating library users with their information needs through the acquisition, organization, and interpretation of text, electronic, and multimedia information resources. … Libraries support the instructional, research, extension, service, and international program missions of … University

- The … Libraries support and enrich the education and research of the University of … by linking students, faculty, administrators, and staff to information resources in any format or location. The … Libraries support instruction and provide consultation in the use of information in a knowledge based society. The Libraries also share information resources with members of the local, state, national and international communities

- Access to information captures the guiding mission, purpose, and service ethic of the University Libraries. The Libraries are committed to effectively supporting the information requirements of a diverse community of students and faculty engaged in learning, teaching and research

- To provide high quality services and collections to meet the needs of … education and research programs. To provide a place conducive to discovery and self education outside the classroom and laboratory. To share with the scholarly world at large the unique information resources of the … Libraries. To take an active role in cooperative efforts that insure access to and preservation of information resources for scholarly research

- The mission of the … Library is to support the teaching and research of the … Graduate School of Education by providing access to information in the field of education, teaching the use of information resources, and supporting the collections, equipment, and staff in a manner that ensures that the library will remain a leader among education libraries

- The University Libraries provide the information, collections, and services essential to excellence in the University's instructional and research programs. The Libraries are an intellectual crossroads for the campus, enriching individual lives and strengthening public life. The Libraries seeks to teach information literacy, including how to navigate the Internet and how to assess information and evaluate its merit and reliability. Librarians collaborate with students and faculty in stretching the boundaries of knowledge, in developing curricula, and in exploring new approaches to integration of knowledge

- We at … Library believe in the leadership potential of … University students. We know that responsible leadership requires the ability to use information wisely in making decisions.

  Therefore we commit ourselves to ensuring that students at … University have the opportunity and freedom to learn to access, evaluate and use the information they need while practicing in the area of responsible leadership

- The … Library, by promoting the interaction between the … community and the increasingly complex information environment, is central to the educational mission of … College.

  An academic department of the college that achieves its goals in close consultation with other academic units, the library utilizes its landmark building and advanced information technology to promote the optimal use of information, stimulate the pursuit of free intellectual inquiry, support faculty research, and instill habits of lifelong learning

- The mission of the … University Library is to assist the educational and research efforts of faculty, students, and staff of … University by acquiring, organizing, providing access to, preserving and providing assistance in using the materials they require for scholarship and research. The Library offers its collections and services to users in an environment that actively supports learning, teaching and research

  The Library also serves as a major academic resource in the region, state, and nation. Within its available resources, and through cooperative resource sharing agreements, the Library has a responsibility to make available selected materials needed by the external scholarly, professional, and business communities

- In active support of … University's mission
  - we provide to the University and wider academic community a place for self education and discovery
  - we promote scholarship and good citizenship through information literacy
  - we acquire, organize, preserve, and deliver information resources and assist users in their effective use
  - we create a great Library for a great University

- The mission of the … Library is to support the University in its educational, research, organization, and interpretation of information resources. In addition, the … Library assumes its special role as a major cultural resource for the community and the region at large

- The … University Libraries are committed to meeting the diverse and changing information needs of the University's students, faculty, and staff, and to participating in resource sharing programs throughout Ohio and the world

  The Libraries' facilities, collections, services, instruction, and scholarship contribute to the University's attainment of excellence in teaching, research and service

  To these ends, the Libraries collect, create, organize, manage, preserve, and provide access to information sources, and foster an environment conductive to academic inquiry, scholarly communication, creative achievement, and lifelong learning

- The mission of … State University is to provide collegiate level career and transfer educational programs and supportive services, which will prepare individuals to live and work in an increasingly technological and global community

- … Library will provide varying levels of access to quality and current research materials and services for students and faculty of … University and persons in the ten county area of eastern …, in a thorough and timely manner

- The mission of the … State University Library is to support the University's mission in providing academic excellence to students
- The … Library supports and stimulates teaching and learning by providing an environment in which instruction and research can flourish. To fulfull its general purpose, the … Library of … University locates, acquires or delivers, organizes, interprets, and preserves information contained in all types of resources. The Library develops information literacy among students and faculty so that they may effectively use all forms of information in teaching and learning
- The … Library strives to provide an environment in which students and faculty encounter and integrate the many branches of human knowledge by providing access to information regardless of format or location. The Academic Library responds to the changing needs of its clientele and is committed to making available new resources and services that foster educational excellence and to teaching their use to the community
- The … Library supports the academic and religious mission of … University. The Library's mission is to acquire, organize, preserve, and make readily available collections of scholarly and related materials in all media; to assist its patrons in finding and using information available at the University and elsewhere; and to encourage lifelong learning
- The mission of the University of … Libraries is to improve the educational, research, and service programs of the university through the dissemination of knowledge
- The mission of the University Libraries is to meet the instructional, research and service needs of students, faculty and staff

Commentary

A sustained critique of these mission statements is not the purpose of this paper. However a few observations are made

- there will be many academic libraries worldwide which have mission statements which are not evident on their websites. They should be. We all have something to learn from each other in the intent and way we express our role, responsibilities and contribution
- in this global communication context it would be useful if university library mission statements—and that of their universities—were given in one or more of the international languages
- the IATUL Conference in Queensland, Australia in 2000 could include a workshop or panel session to examine approaches to mission statements and educational goals, and in particular if there is anything distinctive about technological university libraries which should be reflected in their mission statements
- of the mission statements currently available through the internet some merge a vision and a mission statement, and some include goals and objectives
- many of them refer, without real meaning, to excellence and quality. Universities tend to do the same. Surely it can be assumed that everyone, in their own way, aspires to excellence and quality
- a minority, particularly in North America, are moving towards an assertion of a central education role
- the majority still describe the library as an institutional teaching, learning and research support agency, focused on information resources and access

The question is, as we near the 21st century, does this last point really convey the educational role, responsibility and potential of libraries and librarians? From their mission statements, at least some university libraries think not. A number of them place considerable emphasis on their facilitation of information literacy, for example. When this does not appear in the mission statement, it is sometimes indicated as a major goal of the library. Some of them refer to the library's role in underpinning that icon of late 20th century education, lifelong learning. However only one of them refers specifically to the library's impact on curricula, when it asserts that

> Librarians collaborate with students and faculty in stretching the boundaries of knowledge, in developing curricula, and in exploring new approaches to integration of knowledge.

Libraries as educational change agents

Worldwide, there has never been a greater political and educational questioning of the inputs and outputs of higher education, or greater perplexity about what should be learned, how it should be learned and how that learning should be evaluated and applied. This is challenging but healthy.

Not so healthy, and a limitation of the mission statements of many university libraries, is that they convey a sense of unquestioning support of the educational status quo, rather than a sense of being an educational change agent, an *agent provocateur* if you like, with special insights about the core currency of the educational process-information.

The only conclusion that can probably be reached about higher education at the end of the 20th century is that some of it is not very high, and that some of it has little to do with education as preparation for the challenges of the next century. There are agencies in universities concerned to change this, particularly those senior university administrators, who despite the increasing demands of corporate management, have retained a strong sense of educational mission, the public good, and societal values; and a sense of the need to change the curriculum and methodological paradigm within their institutions. They have a keen sense that the 19th century approaches which still characterise late 20th century higher education, will not suffice for long in the next. They may also have been persuaded that information technology can be the main driver of that change, when information technology can never be a driver, only a road - a facilitator, an opportunity.

Information technology is ultimately but a tool, and only one of the tools which universities, libraries and librarians use to fulfill their mission and responsibilities. Thus it is a logical nonsense to argue on educational grounds for the structural convergence of university libraries and university information technology units, which was something of an educational fad in the late 1980s.

The funding impact

An outcome of not understanding this, may well be that information technology, in all of its guises, becomes that institutional bottomless funding pit which libraries sometimes used to be viewed as by administrators - even if they rarely were. Libraries themselves are heavy users of information technology, more effectively than most because of their client orientation. Yet a major reason why libraries usually cannot make their fullest contribution to teaching, learning, research and educational change is not because of the crisis in scholarly publishing, it is not because of the cost of serials, it is not because of the cost of, and licensing restrictions on the use of, electronic products.

The major reason is because at the institutional level library budgets are residually, and historically, determined by

- a didactic, content focused, teaching paradigm which still requires overwhelming expenditure on staff who spend much of their time conveying content which can be found elsewhere
- increasing expenditure by institutions on ill performing information technology, driven by technolusts outside of, and sometimes within, the institutions. Every dollar spent on such

information technology is a dollar that would almost certainly be better spent on a library, its services, resources and staffing.

As noted earlier in this paper it is the ultimate irony that, in this so called age of information, those agencies and individuals best qualified and able to challenge the technolusts, and best able to help change the educational mindset, are not better recognised. There are probably too many vested interests and institutional rigidities to suggest that the Library-College concept of the 1960s could be resurrected in the information abundant and globally connected 1990s. However libraries, given the increasing emphasis on student centred learning, problem based learning, information literacy and lifelong learning should position themselves to receive a much larger slice of the funding cake, instead of acceptance of too little, or too ready compliance with the persistent admonition to do more with less.

A university which really seeks to innovate, contribute and thrive in the 21st century is one which will invest pedagogically and financially in information literacy as its key educational aspiration for its graduates. In this context it is surprising that no university has yet adopted a slogan similar to 'Preparing people for the knowledge age'. Such a thriving university is also one which will invest not a meagre 5 or 6 or 7% of its budget in its library, but one which will work towards providing it with at least 25% to make it truly the heart of its educational endeavour, through which its learning lifeblood will be pumped.

Even at a lower level of investment, this will not occur unless university libraries are more assertive and specific about their educational role and aspirations than many of their mission statements suggest. It will also not occur if they do not - from their position of real knowledge about the utility and limitations of information technology - publicly join the challenge to the technolusts and their beguiling, but too often extreme, enthusiasms and predictions.

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IATUL

INFORMATION TECHNOLOGY INFRASTRUCTURES AND SERVICES FOR CREATING A LIBRARY'S UNIFIED INFORMATION SYSTEM

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Introduction

Library facilities, like all other organizations in modern society, have begun to automate library services by using information technology tools and methods. The process, still in evolution, is being carried out in many and increasingly diversified ways. In fact, some libraries have started to make use of information systems (such as Aleph 500, Dobis-Libis, SBN, etc.). These systems allow both users and library staff (the administrators and the managers of libraries) to exploit many new library services. Other libraries are, instead, experimenting with partial systems created exclusively for library staff (such as, for example, the owner systems for cataloguing or lending).

On the other hand, many libraries often provide the same services using different information systems (i.e. different hardware and/or software), that consequently require different modes of fruition.

There is, actually, a considerable difference both in what the library services have to offer and in the modes of fruition of the services themselves.

Obviously, the telematic connection with libraries (i.e. the library network) is useful for the remote fruition of library services. However, considered the different systems now available, such a network creates serious problems in terms of information technology infrastructures, such as the transport protocols, access methods and interoperability services.

At this point, one of the most pressing problems to solve is to create unified infrastructures capable not only of connecting library facilities to a network (library's unified network), but also to create a library information system (library's unified information system). The latter must be characterized by services accessible through modes that are shared and accepted by each entity of the information system. In this way, each different library facility becomes a different node of the network. Each information system provides users and other information systems with their own library services.

This paper also discusses some interoperability services by means of which is possible to create a library's unified information system. The paper analyzes and discusses the technologies for data based cooperation and application based cooperation, according to how appropriate they are in the library system. Important issues, such as those relating to legacy systems, will also be taken into account. Finally, the potential of a common graphic interface in cataloguing procedures will be discussed.

Characteristics of a Unified Network

A network of computer may assume different levels of complexity; for example, it can be constituted by only single computer as well as by networks of computer, and so on. We are interested in a network whose nodes are complex structures. In particular, in each node of such a network there is a different informative system.

For such a network, the essential elements to take into consideration are the following:

- the interconnection between the nodes, that is the protocols and the physical infrastructure for transporting and handling of the data;
- the interoperability services available to all the nodes of the network;
- the services for the application cooperation, that is the methods and protocols to make the applications running on the network interacting between them.

All these elements become critical points when an open scenario is considered. In fact, the presence of proprietary systems on the market make very difficult to solve the several problems arising by considering the interconnection, the interoperability and the application cooperation levels of services.

The first step in the direction of solving such problems is to consider only open network, where the necessary standards are given and shared.

The second and resolving step is the creation of an organizational structure whose finality is to draw the technical, organizational, administrative and legal lines to which every user of the network must fit in. Such a structure must provide essentially a general architectural solution for the aspects regarding the cooperation among the administration's information systems. It has to guarantee every authorized user (citizen or administration) the access to the information system data and procedures of all the administrations belonging to the unified network, indipendently from the technologies adopted by each node of the network.

Thus, a unified network is a network of networks, that must guarantee the autonomy of each administration in the following fields:

- architecture of the information system;
- management of the users;
- management of security and privacy;
- services offered to citizen and others administrations.

The transport and interoperability are essential in order to provide the users (citizen and administrations) with many of the services that a unified network wants to make available. However, the main function of a unified network is the cooperation among the application processes of all the administrations operating in a well defined domain. In our case, we are interested in the domain of:

- supervision and management of cultural assets;
- access systems to information, documentation and services.

In order to obtain such an applicative cooperation it has to evolve from a unitary network towards a unitary information system. The latter can be defined as a virtual system constituted by the information systems component of each single administration such that, interacting through specific application procedures, have the purpose of improving the services offered to the citizen and to the community in general. This means that all the libraries, connected in a unified network which is even a unified information system, will be able to offer all the services, now available only to a restricted portion of users, to all the potential users in a wider range, improving at the same time the quality of the services themselves.

The application cooperation
As it has already noted, the real innovative and relevant aspect in a unified network is the application

cooperation level of services. One of the possible definition of cooperation is that given by the Italian Authority fo Information Technology: "to cooperate substancially means to share and modify information belonging to various domains through specific application procedures". Of course, this can be accomplished only by a network architecture corrisponding to the model described in the previous section. The application cooperation can be activated on domain and services of great interest for the community. Among them, there are surely the following:

- supervision and management of cultural assets;
- access systems to information, documentation and services.

In order to obtain the application cooperation, an architecture based on the concepts of Application Ports and Domain Designated Ports [1] must be realized.

Library services can be offered in an advanced way by defining a domain on libraries. This is a large services area, where a cooperative effort among libraries can be carried out. The relevance of the unitary network in this case will be evaluated on the basis of the social impact due to modernization (i.e. service quality, openness, and so on), even under the contribution to the development of the less rich regions, allowing the professional increasing of the operators in a substantially uniform way, thus reducing the gap between industrialized regions and less fortunate regions.

One of the main characteristic of the domain of libraries is the requirement for managing and processing documents, essentially based on the hypertext model (Internet technologies). The services offered in this application domain are dedicated to both specialized users and general users. In fact, for general users, the possibility of viewing the documents requested by means of a research mechanism is a very great improvement in approaching the library services. On the other hand, the application cooperation makes easier the work of the operators of each single library connected to the unified network, allowing the improvement of the efficiency of all the bureaucratic procedures needed for the correct management of a library.

The application cooperation in the library domain is based on two essential functions: the export of services and the access to any other domainthat provides useful services for its own work process. Thus, the library domain has to define what kind of services can be exported and the user profile. This seems to be the real critical point towards the realization of a unitary network, requiring a high level of organization. In particular, as it has been already realized by the U.S. Interagency Management Council, there are two roles to be played:

- the directing strategy, to be assigned to an Authority for Information Technology,
- the harmonization of the legislation, to assigned to the Public Operations Departement;
- the planning and managing the cooperation action, to be assigned to a Application Cooperation Center.

Such a level of organization, while on one hand it is necessary to the successfully realization of the unified network with the application cooperation services, on the other hand it represents the main obstacle to the effective realization of this ambitious project.

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IATUL

SHARING METADATA: ENABLING ON LINE INFORMATION PROVISION

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Introduction

Online education, although by no means perfected, is now a reality. Hand in hand with its development are the continuing advances in education materials management. This paper describes work being carried out both in the field of online education provision and library systems. It briefly describes a prototype online learning environment (GESTALT) [1] and highlights the implications of such environments on libraries in terms of discovery of course components and relevant support material. The task of cataloguing, already one of the most heavy in terms of human resources, becomes an increased burden when it relates to digital material. It becomes necessary to describe not only the content and form and location of such material, but also, other metadata concerning its accessibility and delivery media. Again digital material may be composed of many separate components which each carry separate cataloguing requirements. In the context of the learning environment, a lecture may have text, sound, graphics, video, self-assessment exercises, a bibliography with hyperlinks. It is possible to tag all these digital objects with metadata in order to describe them and also to aggregate/desegregate so that the material may be used in a highly modular way.

Such a vision of online information provision requires the capability of searching through online repositories of information in an efficient manner and for libraries to be able to support the cataloguing activities about their collections to this degree of detail.

The UNIverse project [2] is developing a library system to support a virtual union catalogue. It also offers mechanisms for facilitating cataloguing activities by enabling record supply.

This activity, can be viewed in the wider context of setting up infrastructures for libraries to share information not only about their catalogues and material, in a traditional sense, but also to prepare for what can be seen as a future enhancement of their role, sharing information about digital objects. The UNIverse system is already capable of processing the whole of the retrieval process from search and locate to order and delivery of digital objects over networks.

This paper focuses on the experiences of a sub group set up within the UNIverse project to specifically test and evaluate the record sharing capabilities of the system, and collaborative cataloguing in practice. These experiences, not only as they relate to the system, but to the wider context of networked information and metadata tags for retrieval, are presented here.

The paper begins with a description of the current state of the art in regard to online learning environments, and metadata descriptions of the learning objects, which constitute the course and other relevant material, along with current practice in union catalogue assembly and maintenance. It continues with an overview of the UNIverse project and the collaborative cataloguing experiment that was conducted within it. Finally, concluding remarks about the nature of the implications upon libraries and their present and future modes of cataloguing activity are made.

Acknowledgements

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Online learning and education materials management

The overall importance of the role of libraries in education, and moreover in distance education [3], is well-recognised [4]. Two important factors can be cited which among others contribute to their increasing participation in educational practice. On the one hand, there is the constructivist pedagogical model influencing much of present day educational thinking, and putting great emphasis on the notions of learning by discovery and exploration, and on the other the technological innovations which enable access to increasingly wider range of materials.

As has been extensively documented, [4] [5] what this means for the librarian is that the task of mediating between learner and resources becomes more imperative, and with the added pressure that they must combine elements of professional librarianship such as enquiry and research activities, with technical expertise [6]. In addition, with both remote and on campus users, they are often the primary source of instruction for students in the use of email, database querying, and other skills.

For librarians, mediating between users and resources, is but one, albeit very important, facet of their mission. They are, of course, also required to select, acquire, organise, make accessible, and preserve material. All this, while they are being subjected to enormous increases in both the numbers of users and the amount of material they can mediate access to.

One example of the increase in material, which is relevant to the education scenario, is the increasing tendency for academic institutions to consider all sorts of content production by their teaching staff as valuable commodities, and to be looking for some kind of asset management system to handle this in-house material. This content is typically primary content material, made up of lecture notes and assignments, reading lists and exam questions. But as tutors begin to explore the possibilities of new technologies for teaching, and bow to the pressure to provide content which can be transmitted to remote students, the material becomes increasingly multimedia.

Historically, either the content authors kept control of such material, or in some other cases, the computing services department, as technical experts, were given custody. However, as the volume of such material increases, and with the realisation by education service providers of the potential for exploitation of this material, the need for adequate management becomes more and more pressing. Furthermore, the philosophy of treating this material as reusable modules is increasingly prevalent. For both the educationalist and the information scientist professional, this calls into play questions of granularity. What is the smallest unit of knowledge, and what should be visible from the catalogue for that material? There is also the question of what other information about the resource should be recorded. Sufficient descriptions of the modules are required, so that they can be searched and located, and in addition displayed and manipulated. Digital resources have other descriptive needs, and more especially when they exist not in any tangible form, such as a CD or a video, but only as bits and bytes that can only be apprehended by the correct access platform of software and hardware. It is not surprising that the Library should be called upon to manage these assets, since it has amassed the most expertise in these areas.

At the present time, there is much research and effort going into the design of metadata for educational software, and into tying to pin down standards that will enable interoperablity of implemented metadata, and particularly in regard to learning object metadata. In this respect, one can mention, the work of the Dublin Core [7], the IEEE LTSC [8], and the IMS [9] in the States, and the CEN/ISSS working group on Learning Technologies [10] in Europe and the ACTS funded GESTALT project [1]. The GESTALT project looks at the process of online learning from a holistic viewpoint, seeing the whole of the process from searching for a course, via an electronic broker, or Resource Discovery Service, to the student enrolling in a Learning Environment, to follow a programme of study and making use of assets (both primary educational content and supporting material) from the Asset Management System. GESTALT is in the process of defining metadata sets based upon the emerging standards for ensuring interoperability of the whole system. Again, in accordance with emerging standards, the encoding of the metadata will be done in XML [11]. This paper is not the place for discussion of these very interesting developments, instead, it wishes to point out the very real burden that will be placed afresh on librarians who will be asked to manage educational digital content for education service providers. For whereas professional publishers of digital material may go some way to help with pre-cataloguing items, it is doubtful whether educational content providers will do so, or will be able to do so, unaided.

For the librarian to be able to cope with the new influx, some re engineering of present modus operandi may have to be undertaken. In the next section, suggestions and solutions for addressing various parts of this complex activity are presented

Co-operation and Collaboration: Linking publishers and national bibliographies; MARC and metadata; Union catalogues and virtual union catalogues

It has been recognised by the library world that bibliographic control over electronic publications (especially those published via networks) is not adequate in the face of the continuous growth in the amount of material being published chiefly or solely in electronic form. Equally disturbing is the recognition that there is no agreed standard of bibliographic description for electronic publications. These were two of the issues that the BIBlink [12] project, funded by the EU, attempted to go some way to tackling. The BIBLink project, grew out of the CoBRa project [13] which recognised that the significant growth in electronic publishing raised issues that needed to be addressed at an international level. Project BIBLINK called upon the bibliographic expertise of the national libraries of Europe, working in conjunction with partners in the book industry, to examine ways that electronic publications are described for catalogues and other listings.

Thus BIBlink spent effort mapping from various MARC formats to various metadata schema. They found that several MARC formats were going through the process of being updated to enable cataloguing of electronic publications, in particular on-line publications. MARC format has unique value for integrating metadata describing electronic resources into existing legacy systems. If libraries wish to integrate metadata into their existing systems, and use existing software (albeit with some updating to deal with new fields) then MARC offers a solution. Indeed, most work has been done on adapting the USMARC format for the cataloguing items accessible through the Internet. OCLC's Intercat [14] project has served as a test bed for the cataloguing of network resources, and as a means to introduce and verify new fields and fine tune as required. Over 200 libraries participated in this project, the majority of them academic (60%) and nearly all of them situated in the US. There are at present nearly 83,000 records in the InterCat database.

To understand why MARC formats should be extended, it is necessary to understand something of the topology of metadata. An essential aspect of the level of richness of a format is the extent of the content, both in terms of range and depth. The attempt to describe more or less aspects of an object will be reflected in the overall level of complexity, for example designation or format rules for content. In order to identify the extent of content the elements describing an object can be clustered into groups.

An example may be seen in a reference model for business-acceptable communication proposed by

Bearman [15]. This defines clusters of data elements which would be required to fulfil the range of functions of a record. The functions of records are identified as the provision access and use rights management, networked information discovery and retrieval, registration of intellectual property, and authenticity. The clusters of data elements are defined in six layers:

1. Handle Layer
    - registration metadata or properties
    - record identifier
    - information discovery and retrieval
2. Terms and Conditions Layer
    - rights status metadata
    - access metadata
    - use metadata
    - retention metadata
3. Structural Layer
    - file identification
    - file encoding metadata
    - file rendering metadata
    - record rendering metadata
    - content structure metadata
    - source metadata
4. Contextual Layer
    - transaction content
    - responsibility
    - business function
5. Content Layer
    - content description
6. Use History Layer

From the above, it is clear that Bearman's model looks at the record in a wider context than the bibliographic context alone, and it is particularly relevant to this paper as it takes account of the business context in which metadata is used. Bearman includes metadata elements that are appropriate for metadata in the context of publishing and supply. In the new model of educational content suppliers, some of these business related metadata will be needed, if education service providers are to market their courses in a global competitive market, and if they are to deliver globally, then it is essential that the metadata take account of delivery mechanisms.

Taking the issue of cataloguing electronic resources from another angle, there have been several attempts to catalogue resources on the Internet in both automated and collaborative fashions. Take for instance, the amount of work on subject gateways [16]. Subject gateways are labour intensive to develop and maintain. They require the constant input of staff who hand pick, classify and catalogue each Internet resource. This is both the strength and the weakness of gateways. The human input allows for semantic judgements and decisions that are the key ingredient for creating a quality controlled gateway. This ingredient is lacking in automated indexes or search engines which can not filter information in such a meaningful way. However, considerable time and effort is needed to make these judgements and decisions and this means that the collection of resources is often small and slow to grow. As the number of resources available over the Internet increases, gateways need to develop ways of increasing the number of resources they can catalogue. The DESIRE project [17]. has identified two ways in which this might be done: firstly by distributed cataloguing, which increases the number of people adding resources, and secondly by automatic metadata entry: improving the efficiency of the cataloguing process.

In order to perform automatic metadata entry, subject gateways would harvest the metadata produced by subject communities into templates. One of the main issues of automatically generating templates is ensuring that the high standards (that set apart gateways from automatic search engines) are maintained. This means that both the resources included in the database should be of high quality as well as the catalogue records themselves.

The DESIRE researchers suggest that ensuring the integrity of resources could be achieved by only harvesting automatically metadata from 'trusted' information providers. A trusted provider would be a site or organisation that had been previously evaluated by the information gateway as a high quality resource. To ensure that the catalogue records remained of a high and consistent quality the gateways would need to promote 'good use guidelines' (including the use of controlled vocabularies) for the production of metadata within their subject community

Along the same lines, in September of 1998, the OCLC launched a worldwide call for participants to their Co-operative Online Resource Catalog (CORC) [18] project seeking to automate cataloguing of Internet resources. The aim of the project would be to explore the co-operative creation and sharing by libraries of metadata. Besides libraries, museums, archives, publishers and other institutions that face similar problems with the proliferation of resources on the Web are invited to participate. The project will build upon OCLC's prior activities in creating Internet resource databases through such projects as the OCLC NetFirst [19] and InterCat [20] databases, but the CORC project will rely more heavily on automated means to build its database. Both NetFirst and InterCat records will be used initially to seed the CORC database. Both full USMARC cataloguing and an enhanced Dublin Core metadata mode will be used.

As can be seen from the above two projects, fundamental to these efforts is the co-operation and collaboration of library and other staff. They have been able to build on pre-existing shared cataloguing activities to create networks that enable quicker responses to the problem of the influx of the web. These shared cataloguing activities are at the heart of this paper, and so deserve further scrutiny.

The idea of collaborative cataloguing is not new, but it was enabled by technology. From the time MARC was introduced, and libraries began the tremendous job of converting from physical card catalogues to machine readable ones, the idea of commercial record supply and union catalogues began to take hold. In the late 1960s, the convergence of technology and a good idea brought the library world into a new era of shared goals and resources. According to the OCLC, the "visionary dream" of co-operative cataloguing is now deeply embedded in library economics, and the result has been the most widely used academic database on the Internet, WorldCat (the OCLC Online Union Catalog) [21].

The step from union catalogues to virtual union catalogues has had to wait until technology was mature enough to support networking, but still there are the known problems of rights of access, etc. The best-publicised example of virtual union catalogues is that of the Virtual Canadian Union Catalogue (vCUC) [22]. The concept of the vCUC involves a decentralised, electronically accessible catalogue created by linking the databases of several institutions. The full implementation of a distributed, linked union catalogue to support all aspects of resource sharing is a complex process involving the resolution of technical, policy and service issues. Obviously, these issues cannot be tackled all at once, therefore the initiative is limited to five interlinked issues. These are: the primary use of union catalogues in support of interlibrary loan, and to identifying and resolving issues related to the record syntax to be used (USMARC and/or CAN/MARC); the provision of holdings information (accessibility and coding); the roles and responsibilities of the union catalogue participant; the standardisation of the use of library symbols; and finally, the format and degree of detail for holdings data.

For some, virtual union catalogues are still too fraught with insoluble issues to be viable. For instance, in a nationally funded project to produce specifications for a union catalogue of university libraries in Greece [23], the decision was made to design a union catalogue with a centralised database, rather than the virtual model with distributed databases. Although this decision was not considered by all those involved to be the most forward thinking, it was seen as the most pragmatic in a region very behind in terms organised library co-operation. As their report explains, many libraries have automated systems and have processed part of their collections, but there is no shared cataloguing activity, every library does its own cataloguing independently. The only co-operation patterns to have evolved are among academic and research libraries that subscribe to a serials co-operative catalogue, operated by the National Documentation Centre. As with most countries in this situation a certain amount of leapfrogging will take place and the design the centralised catalogue of 32 higher education institutions can be seen as a first step in bringing collaborative and networking to the Greek Academic Librarian, and breaking the mould of isolation.

The case of the Greek academic and research libraries has been picked out as it provides the background for the collaborative cataloguing experiment taking place within the Greek group of libraries that is testing the UNIverse system.

UNIverse and collaborative cataloguing

Within the European funded project UNIverse a large-scale project based on the concept of a virtual union catalogue, a series of advanced library services to both end-users and librarians are offered, namely:

- Search and Retrieve - very large scale, transparent multi-database searching
- Mixed-media document delivery - integrated to the search and retrieve process
- Inter-Library Loans - integrated to the search and retrieve process
- Collaborative cataloguing/ record supply - an efficiency gain for the librarian.

The virtual union catalogue forms the core of the UNIverse system around which a number of key features have been built. Firstly, the ability to perform parallel searches upon multiple physical databases which have a variety of access methods, record syntax, character sets and languages, and see the results as if a single logical database were being searched. Secondly, the multiplicity of data sources is hidden from the user and a high quality of service is achieved both in terms of performance and data quality through record de-duplication and merging. Thirdly, through the use of Open Distributed Processing techniques the architecture has potentially unlimited scalability whilst maintaining high performance.

The libraries that are testing and validating the collaborative cataloguing aspects of the system are those in the Greek group headed by the National Library of Greece. This group comprises universities, a professional society library, and the library of an internationally renowned college. While there are some overlaps in their collections, the group's main cohesion derives from the willingness of its librarians to enter into such experiments, and their hopes that this will lead to greater collaboration between their institutions.

In the wider context, some of the aims and benefits of a Collaborative cataloguing service are a better use of staff resources; enhanced records; mutual benefit to specialist libraries; contribution to virtual union catalogue; potential source of revenue for supplying libraries. However, in the context of the Greek group of libraries, whose history of collaborative cataloguing is non existent, their hopes are more specific. Universe offers the attraction of a *virtual* Union Catalogue, with all the advantages of immediacy, flexibility, and scalability. Each institution involved employs substantial number of cataloguers as a proportion of its total staff, they hope UNIverse will offer a better use of these staff resources in terms of quicker throughput of material; substantial lessening of cataloguing backlog; better quality records. They understand the virtues of collaborative cataloguing as opposed to simple record supply, which will also enable them to share specialist subject knowledge

The libraries are at present engaged in evaluating the system. The plan is to test the use of the collaborative cataloguing scenario over five features of the record supply service. These features are: search and retrieve records for download using a variety of fields; merge records/multiple records; to create records; to enhance records; to test the use of the audit trail where libraries use the Universe Client, and the server is able to record data for the supplying library. Wherever possible each library will play both supplier and recipient roles.

Technically, the system is simple to understand. Initially, the user will search a number of targets using the UNIverse client. This search process will generate a result list that the user can select records from. When the user selects the option to download (or export) the record, a dialogue is presented to allow the file name to be specified and the required record format/syntax. Typically the local catalogue system will have a daemon process running that looks for files appearing in a pre-determined director. When new files appear the process will import the records into the local database. The record download system will then be used to place records into this directory causing them to be automatically uploaded into the local catalogue. (This daemon process is not part of the Universe system).

Some predictions for the future

MARC has been with us for nearly 30 years and has been very useful, but the new Internet and web enabled communications require new indexing paradigms, or at least extensions to existing MARC. However, the vision of embedding, or attaching, other digital information to the – bibliographic- record is strong. The influx of digital resources is already overwhelming, the expected influx of educational material promises to place even more urgent demands upon education services providers' asset management staff. The problems are still looking for the best way to apply solutions. The technological change affects the objects to be described and the systems used to manage bibliographic data. The issue was laid out succinctly by Hickey: "Now, libraries need a system to create and share metadata for online resources to help automate resource selection, creation of the metadata itself and maintenance of links." [24] Fundamental to the technical system of creating and sharing metadata, will be the same types of human centred networks already existing for collaborative cataloguing activities. The metadata will probably exceed by far the level of detail found in the average bibliographic record. As we have tried to show in this paper, and is the experience of the UNIverse Greek SIG, collaborative cataloguing and eventually, sharing metadata, will in the end depend as much on the technology as on the co-operative networks of participants involved.

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    EEVL (The Edinburgh Engineering Virtual Library, UK) http://www.eevl.ac.uk/volunt.html
    ADAM (Arts, Design, Architecture and Media Information Gateway, UK http://adam.ac.uk/friends/
    Biz/ed (Economics and Business Education Gateway, UK)
    http://www.bized.ac.uk/inform/infohome.htm
    EELS (Engineering Electronic Library, Sweden) http://www.ub2.lu.se/eel/about.html

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BREAKING THROUGH WITH THIN-CLIENT TECHNOLOGIES: A COST EFFECTIVE APPROACH FOR ACADEMIC LIBRARIES

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Illinois Institute of Technology is a private, Ph.D.-granting university focusing on engineering, business, law, architecture, design, and psychology. IIT is located in Chicago, on a campus designed by Mies van der Rohe and has some 6,000 FTE students. The university has three campuses in Chicago and two campuses in the suburbs of the city. IIT's Main Campus, which concentrates programs in engineering and science, is served by the Paul V. Galvin Library.

Introduction

After spending the past two decades learning more about the fundamental shift in the way information is produced and accessed, the reality of the financial management of academic information technology is settling in. We are now at a crossroads. Passage will require institutions to adapt to new opportunities and strategies as economic pressures grow. New strategies must include innovative methods in the development of economic models, outcome assessment, and a true accounting of the cost of owning new technologies.

As Oberlin explained in his CAUSE article, *The Financial Mythology of Information Technology: The New Economics,* "One of the most misunderstood aspects of managing information technology is the attendant economics. The rate of technical advancement is accelerating, demand is intensifying, standards and architectures are changing daily, prices are falling, but total costs are growing." (1996) Oberlin argues that "the principal forces driving the new economics of information technology are: (**1**) its steadily increasing in value, (**2**) academic demand for information technology and computing power is virtually unlimited; (**3**) the per unit price of information technology is declining rapidly; and (**4**) the rising total cost of owning and maintaining these systems. In other words, the potential benefits are truly revolutionary and the demand is insatiable -- but falling prices mislead many to expect cost savings that will never materialize." (Ibid.)

Institutions are trying many strategies to enhance their ability to control IT costs. These include adoption of cost analysis principles, new university funding models, outsourcing of specific tasks, engineering of corporate contracts for purchases, support, and maintenance, etc.

As libraries within academic institutions move their paper-based indexes and abstracts and full text/full image standalone databases systems to online environments, new needs for equipment, training, and operations are emerging. At IIT, the explosion we have witnessed in the number of users and the level of usage (approximately 350,000 Internet/Intranet "hits" every month from library workstations) of such services attest to the success of these new methods of information access. IT has drastically increased the total cost of operating academic libraries. In our university, the demand for these services has risen and the cost of fulfilling such demand has obligated us to acquire more equipment, spend more time working on ways to reallocate monies, and endless hours looking for grants that support IT operations. IT support has become a Catch-22. We need to take a deep look inward at our strategies as we eye technology for solutions that enable us to meet our users expectations as well as our financial bottom line.

Lowering the Total Cost of Ownership (TCO) is one of the many approaches we are exploring to lower the cost of offering online information services to our users.

TCO has many different base elements that vary slightly from one institution to another. Some of these elements include: the actual cost of the hardware and software, user training, the IT maintenance and support staff, the network application support of a client machine, connectivity to the university backbone, contracted technical support and the personnel involved in purchasing, accounting, and inventory. Although we are working on a number of strategies to lower TCO, we find the trend towards network computing, built around the idea of server centric, thin-client technologies to be the most promising.

Thin-Client/Server Computing in Higher Education

Although the critical IT challenges faced by academic institutions rival those of any industry, colleges and universities started to take serious notice of thin-clients when a number of technologically aggressive industries such as FedEx and Komatsu made the trade press headlines with large scale implementations of the technology.

What's a thin-client?

Thin-clients are PC-like devices that embody the idea of the network "appliance" (Tuller, Oblinger, 1998). Although like the PC in appearance (and, hopefully from the user's end, functionality), the thin-client is a clear demarcation from the PC at the technical level. Unlike PCs, thin-clients cannot function without being connected to a server. Thin-clients do not house hard drives or localized operating systems. Applications are either run directly on the server and used via a terminal program, or they are downloaded from the server and executed locally within the thin-client's RAM. The thin-client, however, is far removed from it's cousin the mainframe terminal. Thin-clients utilize Windows and Unix-based graphical applications as a normal PC or workstation, but from the server side, not the client. It is traditional host-based computing with a significant twist: full functionality with not only host-based applications, but also the full array of client/server and PC-based programs – all residing on the server and administered and configured there. The thin-client has evolved from client/server computing as client/server evolved from host-based computing.

Few would disagree with the fact that costs of client/server computing have begun to outpace most organizations' capacities to keep up. PCs are generally underutilized in proportion to their processing and storage power and they are exorbitantly expensive to maintain a point we will outline later. In client-server computing, most applications are developed along the "fat client" model. (Sheehan, 1998). Servers primarily function as repositories for data and shared code, while the client (PCs and workstations) are responsible for much of the processing. As programs have moved from text based to GUI's, the PC has become fatter, and the costs of configuring and maintaining the PC to run a multitude of memory intensive, locally loaded programs have skyrocketed. A typical staff PC running NT Workstation 4.0 at Galvin Library, for example, will be loaded with Microsoft Office 97 suite; WordPerfect, the entire Netscape Communicator suite, the Adobe Acrobat suite for document imaging, and an array of Online Public Access Catalog (OPAC) and Integrated Library System (ILS) software. A typical public area PC will run a current version of the Netscape browser along with a host of plug-in applications and local security programs. Our default configuration for one of these machines is 64MB RAM and a minimum 233 MHz Pentium processor, double the requirements of just a year ago. The average price of a networked PC in the Galvin library, fully configured, networked, and properly licensed for all installed software, is approximately $3,000 out of the box. Adding to this price is an upgrade cycle for both hardware and software that requires an almost constant allocation of resources and time. Public area workstations pose an even larger challenge and, on average they consume twenty-five percent more technical support time than staff PCs because of high volume use and user tampering, which can frustrate even the most experienced of PC technicians. The current client/server conundrum offers some hope towards greater efficiency in this regard. As PC technology improves and software becomes "thicker," upgrade cycles become more relentless, and asset volatility reaches unjustifiably high levels, organizations will be compelled to explore alternatives to the "fat client" general use machine. Sheehan sums up the situation as follows:

> "The same problem occurs everywhere…PCs have to be replaced with bigger, faster, 'thicker' ones. Expensive network connections need to be upgraded to meet the need for speed. Total cost of ownership figures are genuinely frightening." (Sheehan, 1998)

Thin-client technologies offer a new approach, one that moves beyond client/server towards a network centric model, reducing ownership costs and centralizing network resources. We will begin our discussion of thin-client computing with some basic definitions. We will outline the differences between the competing technologies involved in network centric computing and make recommendations as to what we think is appropriate for an academic library environment. We will also go into further detail on the subject of TCO, as all of the advantages of thin-client computing are inextricably linked to the economic issue.

There are two types of thin-clients, each markedly different from the other. Network computers or "NCs" are manufactured by the likes of IBM, Sun, and Acorn Computers. Sun thin-clients, commonly known as JavaStations, are the biggest market leaders in this field. NCs contain RAM, a processor, and input devices. They are connected to the network via an Ethernet port (although alternative configurations such as token ring are also supported to some degree), and boot directly from the server. Once the boot process begins, the server downloads the NCs operating system into the thin-client's RAM. Requested applications are also downloaded in this manner. NCs such as JavaStation run one program at a time. Because of the inherent processor requirements to run a downloaded OS and applications from the server, NCs are heavily equipped out of the box. A typical JavaStation is configured with 32 MB of RAM and must support newer networking standards such as fast Ethernet and ATM in order to run at acceptable speeds as compared to their PC counterpart. In the case of NCs, the "fatter" a thin-client becomes, however, the less it becomes distinguishable from a PC seemingly reverse evolution that is becoming a source of humor for many in the computer industry, especially PC manufacturers.

The second type of thin-client technology the Windows Terminal or, "WT" comes as a result of a strong development push over the last three years by Microsoft and industry partners such as Citrix, the purveyor of the widely popular server-based Winframe products commonly used at many universities today. Windows terminals more closely typify the idea of network centric computing in that they are completely reliant on the server for everything that they do. When booted, a WT notifies the server that is present on the network. No OS download occurs. The WT simply emulates the Windows (NT) environment that is running on the server. The Windows environment and its associated variables that appear is contingent on the user login profile and the published applications available, similar to the "roaming profiles" model used on NT and Windows 95 LANs. Processing on the WT is limited to keystrokes, screen paints, and mouse clicks. The server does the rest. A typical WYSE WT will come pre-configured with four to eight MB RAM, a processor, and input devices. The WT will also house a ROM chip which can contain data such as a static IP address and configuration information for local peripherals such as storage devices and printers. WYSE , Tektronix, and Boundless Technologies are the leading manufacturers of Windows terminals.

E :h technology, the NC and the WT, offer advantages and disadvantages. Before embarking on a discussion of the differences, we will begin with the mutual advantages offered by both.

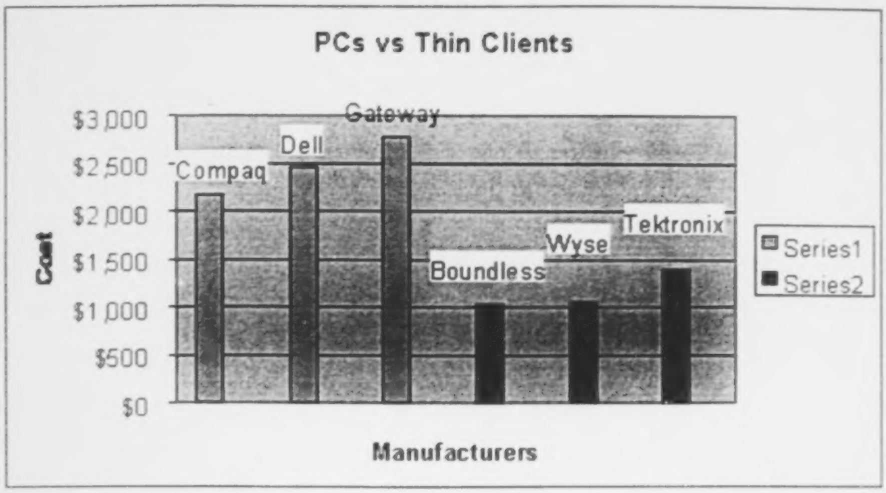
Network Management and Technical Support
The cornerstone of thin-client technology and, its "greatest virtue" (Sheehan, 1998) is of course, the fact

that software environments are stored completely on the server side, allowing the kind of centralized control that has been long sought after but by no means perfected by the producers of PC-based network operating systems such as NetWare (ManageWise) and NT (Zero Administration). Thin-clients are essentially "dumb" boxes that serve as access points to the network, not partners with the server as in the client/server model. Because they do not run volatile local operating systems, network administrators can focus their concentration on the server rather than the client. Of course, in a network centric model, the server must be fairly robust, a situation that spawns new support issues. Nonetheless, the larger the number of PC clients on the network (especially PCs that run only a few applications -- a point we will touch on later) the more compelling the case for centralization with thin-clients and its associated management advantages. Asset control becomes manageable when compared to a network dotted with a bewildering array of PC makes and models scattered throughout the organization. In a typical LAN-based, PC-oriented environment, IT managers, on average overestimate their hardware assets by 32 percent. (Wilson, 1998)

Software
Because thin-clients depend completely on the server for their operating systems and applications, updates and upgrades to programs can be done at a single point, eliminating the need for technical support staff to attend to each PC on the network, either directly or through automated (although incredibly complicated) server-to-client downloads. Licensing can also be better maintained, an advantage made all the more critical by the fact that, the average workplace PC contains approximately $405 worth of unlicensed software. (Ibid.)

Security
Although this is a seemingly simple point, it cannot be understated. Thin-clients do not have corruptible operating systems, because they do not contain hard drives. Software (read, viruses) cannot be loaded onto the desktop to wreak havoc. Those few users who may have the need to download software onto the server are limited by environmental constraints as defined by the server administrator. These constraints are far more secure and manageable than anything that can be done on a desktop PC.

Cost
Contrary to what we see in the consumer retail PC market, the average cost of a PC for institutional use has not seen the drastic reduction in price enjoyed by the home user PC makes and models. In 1995, the Galvin library spent approximately $3,300 for a Pentium 75 MHz PC with a 17" VGA monitor and 16MB RAM. In 1998, we spend approximately $3,300 for a 300 MHz Pentium II PC with a 17' monitor and 64MB RAM. System requirements have risen with advances in software, and the upgrade cycle has grown shorter. Although there are cost recovery issues associated with thin-client computing–namely the need for professional level technical staff, along with fat servers -- the costs of NCs and WTs machines are striking when compared to PCs. The following diagram contains a sampling of PC and thin-clients prices as quoted directly from the manufacturers. PC configurations are based on the standard requirements for public area PCs in Galvin library (300-350MHz processor; NT Workstation 4.0; 64 MB RAM; 17" color monitor). Thin-client configurations are based on manufacturers recommendations for PC replacement on a 10BaseT network supporting Windows and Web based applications. 17" monitors are included in the thin-client prices.



PC and WT (Thin-Client) Price sampling as of December 1998
Average Cost of PC: $2464.00
Average Cost of WT: $1125.00

Choices in Thin-Client Technologies
Windows Terminal (WT) and Network Computers (NC) differ in several key areas, each posing its own challenges to the library IT professional. In general, NCs require more computing power on the client side and less on the server side. WTs require very little on the client side, but rely on very "thick" servers. NCs rely on UNIX servers, while WTs utilize run off of the Windows NT server platform, generally in conjunction with the aforementioned Citrix Metaframe product. WTs offer greater flexibility than NCs: PCs of all stripes can be transformed into WTs using the Metaframe product. Citrix claims to have successfully tested it's ICA architecture on generations old PCs, including 386s, with little or no performance degradation. (Citrix, 1998). Both systems utilize network bandwidth differently, with NCs generally requiring a larger pipe, especially during the slow boot process during which the operating system downloads into the client's memory. Finally, because of their contrasting platforms NCs and WTs require different skill set for network administrators. The following list offers a breakdown of the key differences between the two technologies by category:

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NCs		WTs
Support for Java applets and/or programs written for native NC processor	**Application Support**	Support for DOS and 16/32 bit Windows apps
UNIX/Java	**NOS Support**	Windows NT
Specifically manufactured NC device	**Client Hardware**	Specifically manufactured WT device or recycled PC, Apple PC, or UNIX workstation
Applications and OS downloaded as needed – high bandwidth utilization	**Bandwidth Requirements**	Application separated from user interface -- highly efficient bandwidth utilization using ICA
UNIX/Java – high level of expertise/training	**Systems Staff Expertise**	Windows NT (Terminal Server) Citrix Metaframe – high level of expertise/training

At Galvin Library, we have begun a thin-client implementation using Windows Terminals. WTs offer the flexibility we require, in particular for public area PCs and departments where staff members need access to only a limited range of applications, most of which are Web integrated via the library intranet or the Internet at large. In the past, small to mid-sized academic libraries have not been able to seriously consider thin-client technologies because network computing was limited to untried, expensive UNIX platforms such as Java. Network centric computing has been associated with hesitancy, mainly because of the "Java Initiative, and having to embrace a whole new set of applications." (Jacobs, 26.) Most libraries in this class do not require users to have access to specially written Java and UNIX applications beyond what is integrated into Web based services. For these libraries, Web and Windows Online Public Access Catalogs (OPAC), office productivity software suites, browsers, and Integrated Library Systems (ILS) have completed the Windows-centered circle. For example, users who access public area workstations at Galvin library require a browser and it's associated helper applications for full access to a range of library resources. This includes digital collections, electronic reserves, OPAC, and subscription based, Web accessible databases such as Proquest of University Microfilm International and Engineering Information of Elsevier, to name a few. All digital library resources are integrated into the Web environment. Staff also require Web access, as well as a host of Windows programs such as GroupWare, email, document imaging systems, ILS database access (via IP directly to the server), and the standard MS Office suite of applications. All of this takes place within the context of a Windows NT 4.0 desktop environment. The library network has evolved to a Web/Windows environment, mirroring trends in the rest of higher education as well as the corporate world. In the context of this Internet-via-Windows environment, network centric computing based on the WT model offers libraries a leveraged alternative to NCs. A recent article on subject in a leading computer trade magazine summed up the predicted popularity of WT as follows:

> "Windows based terminals are important, according to users and analysts, because unlike early network computers, they were specifically designed to serve the huge installed base of Windows users. Through add on software, they also offer access to non-Windows applications and are *server centric*." (Ibid.)

Indeed, Windows is ubiquitous. Increasingly, libraries are becoming more in step with the corporate world in that applications are being standardized and version control enforced in order to contain software license and support costs. Internet access, platform independent in nature, is generally handled by using a browser written for MS Windows. With some instances of exceptions such as Apple PCs (which can still be used as WTs), Windows 95 and NT are the operating systems of choice for most academic libraries.

There are two components to a network using WT technology: Windows NT Terminal Server 4.0 and Citrix Metaframe. Both are the results of a two-year, joint development project between the two companies. Citrix defines its technology within the context of its integration with Microsoft as "being made possible by two Citrix technologies: Citrix ICA and Citrix MultiWin, the technology licensed by Microsoft to jointly create NT Terminal Server Edition," enabling "multiple users to simultaneously access applications running on a single server." (Citrix, 1998)

Using Metaframe as a base, Citrix defines its interpretation of thin-client computing as follows:

> "Thin-client/server computing requires a multi-user operating system. This allows multiple concurrent users to log on and run applications in separate, protected sessions on a single server. Thin-client/server computing also requires a remote presentation services protocol capable of separating the application's logic from its user interface, thus allowing only keystrokes, mouse clicks, and screen updates to travel the network. Finally, thin-client/server computing requires centralized application and client management. This type of server-based computing model is especially useful in that it allows enterprises to overcome the critical application deployment challenges of management, access, performance, and security." (Ibid.)

Although Terminal Server can be used without Metaframe, the addition of Citrix's ICA to the model provides some very powerful functionality unavailable by using Terminal Server on it own. Any WT network must support either "Microsoft's Remote Desktop Protocol (RDP) or Independent Computing Architecture (ICA). For network administrators needing flexibility, RDP is quite limited without ICA. Among the differences are:

- Terminal Server supports only IP and offers no method for remote drive mapping. Remote drive mapping is especially important for using attached peripheral devices such as floppy and ZIP drives. ICA supports remote drive mapping and multiple protocols.
- RDP does not allow for object linking and embedding (OLE) cutting and pasting.
- RDP does not allow for seamless windowing.
- RDP does not allow for remote configuration of client machines. ICA allows for server-based distribution of client configurations.

- RDP uses 200K and 300K per connection at peak. ICA, originally developed as a client to server protocol to work over standard telephone lines, makes much better use of bandwidth, peaking between 15K and 20K per connection.
- RDP will not support asynchronous connections. ICA supports synchronous and asynchronous connections.
- Web delivery of applications is not possible without Metaframe. This is especially important if one want to launch applications via HTTP links. It is crucial in Intranet environments.
- RDP does not allow for load balancing. ICA allows for load balancing among different servers, greatly improving processor utilization and allowing for unlimited network growth.
- RDP does not allow for secure, across the wire encryption. ICA includes support for secure encryption.
- RDP does not allow for session shadowing, the ability to monitor sessions from the server. For various administrative and management purposes, this functionality is essential. ICA offers session shadowing under a variety of circumstances.
- Windows Terminal Server and RDP do not support the full range of clients as Metaframe and ICA. These include Apple PCs, JavaStations, DOS machines, X-terminals, etc.

Public access workstations in academic libraries have presented us with management, access, and performance challenges. Deploying the needed applications in the library environment has been complex and time consuming. Library IT staff have to physically distribute applications to every client device, tackle the issues associated with the new version updates, and support the multiple system configurations in a number of branch libraries on different campuses. When some of the older equipment that is not well-suited for high-bandwidth applications shows poor performance, many students simply abandon using a resource the library has already invested thousands of dollars in to facilitate access to textual information. Security has also been a major challenge. Critical applications and data reside on client desktops which increases the risk of unauthorized use, and in turn, the time IT staff have to spend to secure those applications.

Use of thin-client/server computing in academic libraries is not limited to public workstations. It can also be extended to both technical services and circulation departments. Thin-client/server extends access to line-of-business applications to existing devices, from fat clients to a broad range of thin-client devices. It also ensures that users can access 16 and 32 bit Windows-based and Java applications without having to rewrite or record them.

Because all applications are deployed, managed, supported, and executed on the server, the library can utilize much of its older equipment, such as PCs and notebook computers, Windows-based terminals, and Unix workstations. In a thin-client environment, all clients function as thin-clients and all have the ability to access and work in highly graphical, Window-based applications – including, of course, Internet browsing.

The suitability of thin-client technology extends to other parts of the university where customer services such as registration, financial aid, and accounting functions are done. However, as Sheehan noted: "In offices, classrooms and laboratories where PCs are equipped with a variety of software tools and their users frequently push the limitations of the machines – an NC or WT environment may prove too confining and may actually decrease productivity." (Sheehan, 1998) Indeed, departments where users need access to a small number of applications seem best suited for thin-clients. For public area workstations, for example, thin-clients are excellent alternative to top heavy desktop PCs. Many systems librarians agree that the technology has reached the point where the cost benefits, in particular in libraries with dozens or even hundreds of PCs dedicated for public use serve only as Web browsers, WTs are becoming a viable solution. As bandwidth and processor issues are worked out, thin-clients should prove attractive to users whose computing needs are more advanced. Many organizations are beginning to implement thin-clients further up the "user chain." When users realized that they could run their Windows applications over thin-client networks, explained one information manager, it really "opened their eyes. I think thin-clients are going to be pervasive, and they are working well for us for everything but extreme power users." (Wilson, 1998)

After the successful deployment of seven thin-client public access units, two of which were older PCs, IIT library has begun the conversion of many of its public and service desks workstations to a WT environment. And although it is early to predict the total financial savings we will achieve, the picture is getting a bit clearer when we compare the PC solution approach we usually follow to a thin-client one. With the conversion of 40% of the current units, factoring in the average PC life span of three years with regular upgrades, and adding technical staff support time, IIT libraries may reach a total saving of 35-45% per replaced PC. Zona Research has predicted a five-year total cost of ownership reduction of 57% by using a model containing 15 thin-clients and comparing with PCs. (1996) Other predictions by Microsoft and Gartner Group suggesting savings ranges of 22% to 46%, have been cited in recent literature. Thin-client technology is still in its early years, and more time is needed to judge its effect on services and the library budget. However, we believe that our early experiences with the technology, as well as continuing evidence from other sectors of higher education and industry, will show that our cost savings estimates are well within reason.

Conclusion and Recommendations

James Burke noted once that, "Never have so many understood so little about so much." A case in point when IT managers and library directors are faced with the difficult task of delivering technology-dependent services whose value is difficult to quantify and hard to measure. With the acceleration of information technology use in academic libraries, we find ourselves faced with the constant challenge of balancing services, costs, and outcome. The gap between our budgets and the cost of acquiring and maintaining IT is widening year after year. University administrators are puzzled by the falling prices in the home PC market and the IT department's continuing requests for additional monies. We must create new alternative to the spiral costs of desktops. Thin-clients are by no means a panacea, and they pose a host of new problems not unique to network centric computing but certainly more pronounced there. These include the risks associated with single points of network failure; the need for highly trained, technically competent IT staff to manage a server based environment; the high costs of "thick" servers and redundant systems; and, finally, the inevitable political problems associated with re-centralizing control of computing resources in the workplace. We believe, however, that there are workable solutions to these issues and that they do not present significant obstacles to thin-client computing. The management and cost benefits offered by these technologies are compelling, as is the case made by the fact that technology environments are evolving towards platform independent, network centric models. We believe that libraries in particular -- and higher education in general -- should start to pay attention.

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THE FUTURE OF THE ACADEMIC LIBRARY AND THE ACADEMIC LIBRARIAN - A DELPHI STUDY

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The authors are very grateful to all the Experts, thanks to whom this study was possible. Especially, that despite the basic rules of Delphi method, we were unable to offer any substantial motivation to work with us. Additional words of thanks go to Simon Francis who helped us to correct our, far from perfect, English. Thank you all.

Introduction

The impressive pace of technological change influences all aspects of human communication. It is crucial that libraries prepare a range of responses to the pressing library questions of the electronic era. There are also other factors that shape the vision of the academic library today and in the near future. What are they? What will the future library activities be? What steps should the average library undertake to be well prepared for the future? What skills should a librarian of the New Millennium have? These and many more questions are asked and answered today by many people in the world. Sometimes their opinions are totally opposite. Who is right? Who can predict the future?

The authors themselves do not pretend to know the answers to those challenging questions. We undertook a Delphi study, the aim of which was to find the most probable scenario for the academic library of the future. A Delphi method was selected, because its core is co-operation with a panel of experts in the field. Based on their opinions concerning the specified problems, we have determined the most important trends in changes observed in the library environment. The aim of this paper is to present the results of this study.

The Method

Delphi is a qualitative method of forecasting, which employs a team approach to decision-making. It involves defining the problem of the study, the preparation of two or three consecutive questionnaires, which are sent to a selected group of experts, and then a subsequent analysis of the responses. As a result, an expert consensus is developed about the topic of study.

The key question of our Delphi study was: What will be the role of an academic library and what skills will an academic librarian need in the year 2005? We were interested in the factors that influence academic library activities currently and in the future. We also focused on the skills and characteristics of the librarian in the new Millennium. The study involved two rounds of questions and was conducted between December 1998 and April 1999. 32 professionals were invited to take part in the panel of experts, 28 of whom kindly agreed. Finally, we received answers from 23 experts in 10 countries (Appendix C).

There is a wide range of methods that may be used to analyse experts' responses. For the first round questions (open type) we decided to use the affinity diagram technique to identify a diversity of ideas, factors, characteristics and other issues appearing in the responses. For the second round questions (mainly of the closed type) simple statistical techniques were used.

ROUND ONE AND ITS RESULTS

In the first round of the study the experts were asked to answer the following four open-type questions (problems):

1. *Key public policies, information strategies and ongoing projects as the context for libraries;*
   List five factors, which currently have the most impact on the picture of an academic library in your country, starting with the most important ones. If a factor needs explanation or further subdivision – please include it. Indicate the way each factor influences academic libraries.

2. *Library activities*
   Discuss briefly five main areas of library activities predicted for 2005. Arrange them in order, starting with the most important ones.

3. *Present and future staff training*
   List at least four characteristics (or/and skills) of a person to be employed in an academic library at the beginning of 21st Century, in the order of their importance.

4. *Library without walls*
   List five the most difficult problems to be considered when dealing with electronic media.

After having collected and carefully read the different opinions expressed by the experts in the first round questionnaire we had to admit that all the material gathered has proved rich enough not only to write a paper but also quite a thick book. Because of the above reasons we have had to decide on a rather high level of generalisation, only getting into details in selected areas.

The variety of factors identified and discussed by the experts after the first-round questions and the range of issues that have emerged as a result of their responses have made it very difficult to identify general groups of problems for further study. The analysis of the responses has led to the identification of some common issues for each of the topics considered. The issues identified and their scope have been sorted using the affinity diagram. We are aware of the fact that both the classification of the issues discussed and their interpretation are not perfect, especially as some issues could be considered in different ways. The proposed classification (the affinity diagram) is presented in a full form in Appendix A. In the analysis below only the titles of proposed categories have been shown. Four graphs show the weighted number of experts' votes according to the proposed classification.

Impact factors

In the case of question no. 1 the diversity of answers was quite large and it was difficult to decide which of the different factors are primary ones and which are only secondary, i.e. resulting from the primary factors. In the end, it was decided to divide all the impact factors into 6 groups:

1. **Finance policy**
2. **IT progress (development)**
3. **Changes in higher education**
4. **Co-operation and regionalisation**
   Although different forms of co-operation among libraries, or between libraries and publishers, are

mainly the effect of financial constraints, the authors decided to list them as an independent factor because we consider co-operation as something more than just a solution to the problem of finance. The validity of such an approach had still to be clarified in the second round.

5. **Law regulations/public issues**
6. **Other**

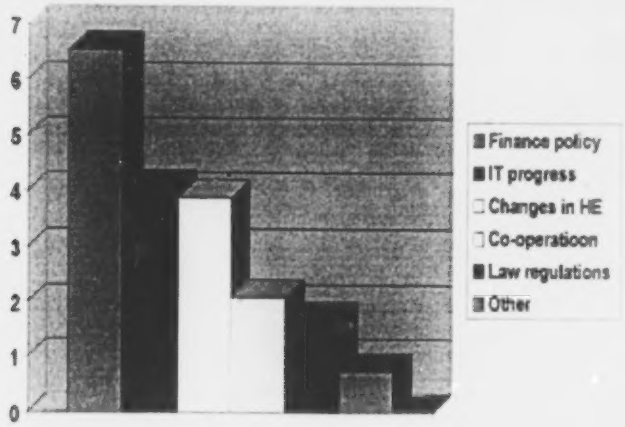

Fig. 1. Impact factors

Library Activities

1. **Involvement in teaching and education**
2. **Information management and information access**
3. **Building collections and making them accessible**
4. **Managing in general**
5. **Creating electronic libraries**
6. **Co-operation and resource sharing**
7. **Support for research and reference**
8. **Social activities**

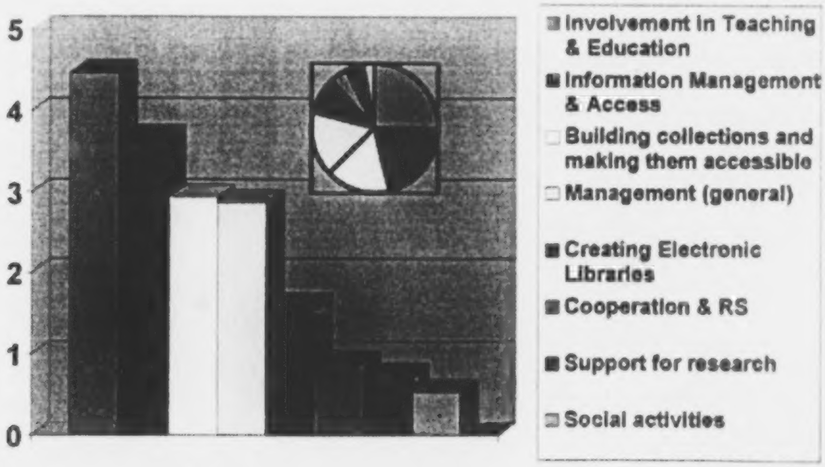

Fig. 2. Library Activities. Pie chart inset to show approximate percentage of different library activities.

Skills of Librarian

1. **Communication/training skills**
2. **IT skills**
3. **Managerial**
4. **Commitment**
5. **Subject knowledge / profiling**

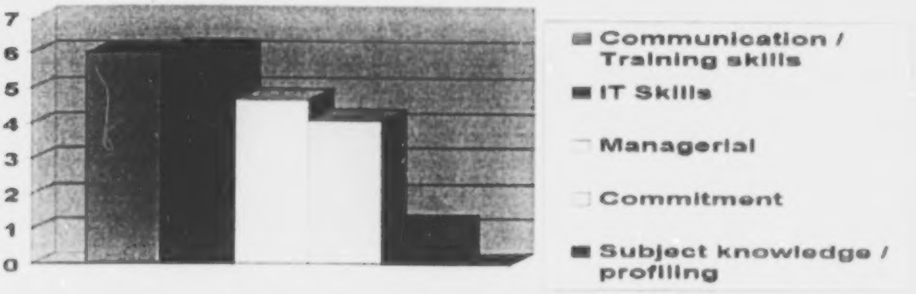

Fig. 3. Skills of librarian.

Problems with new technologies / electronic media

1. **Managing electronic information**
2. **Dealing with pace of change**
3. **Legal**
4. **Finance**
5. **People (human factor)**
6. **Competitiveness**

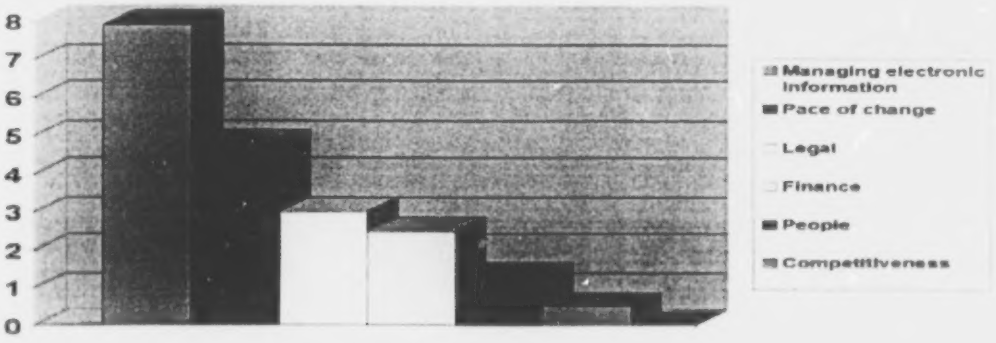

Fig. 4. Problems with electronic media

ROUND TWO AND ITS RESULTS

Basing on the above analysis, the second questionnaire was prepared containing 12 closed-type and one open-type questions.

The first nine questions contained a brief observation and proposition submitted by the authors. The experts' task was to express the level of agreement with the proposition using closed-scale statements: strongly disagree, disagree, neither agree nor disagree, agree, strongly agree. The full text of questions 1-9 as well as the rest of the questions asked in the second round questionnaire is given in Appendix B. Below we give the short form of the proposition given in questions 1-9 of the second round of the study for the purposes of the following analysis.

Propositions of questions 1-9 of the second round questionnaire (in a short form):

Q1: Library budgets will significantly improve in future due to a variety of actions undertaken by libraries.
Q2: Libraries will have to introduce more paid services and seek sponsors.
Q3: Co-operation between libraries is a budget-independent tendency.
Q4: Libraries will provide basic PC/software training and provide access to the Internet.
Q5: Libraries will be deeply involved in distance learning by providing technical infrastructure and the necessary services.
Q6: There will be staff increases in information services and a decrease in traditional library divisions.
Q7: Library managers will be graduates from academic schools of economics and business centres rather than library professionals.
Q8: Libraries will merge with the computer centres of their parent universities.
Q9: Due to its chaotic nature, the Internet will decreasingly serve as a source of professional information.

Experts' answers to the above propositions are presented in fig. 5. Dots show the average level of agreement with the theses and error bars represent the values of standard deviation. Such a presentation makes it possible to show not only the overall response to a given proposition but also the dispersion of the answers received.

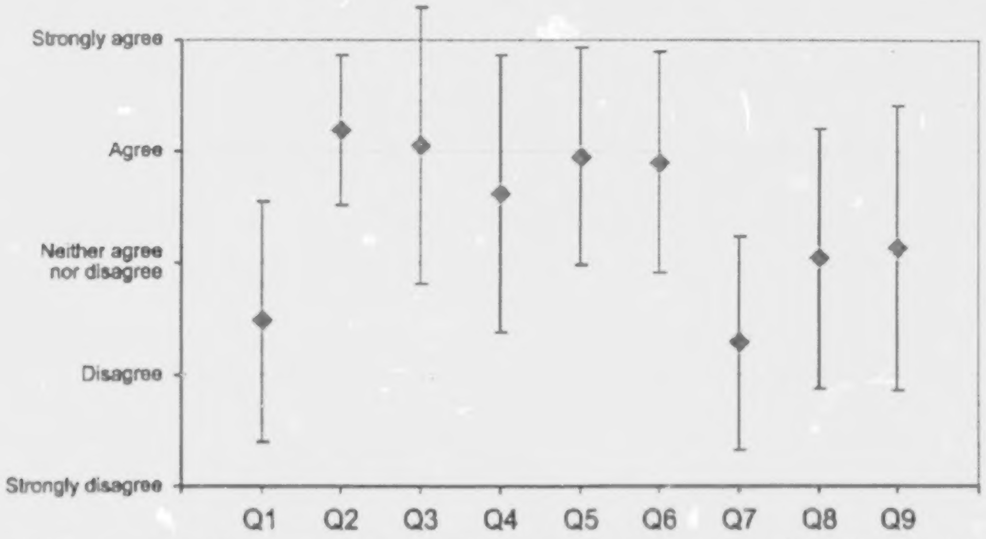

Fig. 5. Average reply to questions 1-9 of the second round (mean and standard deviation)

As it may be seen, there was a generally positive response by the experts to the propositions presented in questions 2-6. Note the low value of standard deviation for question 2 which means that almost all experts agree or strongly agree with the proposition, that libraries will introduce more paid services and will look for sponsors to find additional sources of money. The proposition that libraries will be able to improve their budgets by lobbying and different forms of pressure on government bodies (Q1) as well as the idea that library managers will be graduates from business schools (Q7) did not find support from the experts. Finally, the last two questions (Q8, Q9) appeared more controversial than had been expected, thus having a "neutral" average and showing a wide diversity of opinions.

The next question of the second round questionnaire, concerning the percentage of different groups of library personnel (see Appendix B, Question 10), brought the averaged results presented in fig. 6.

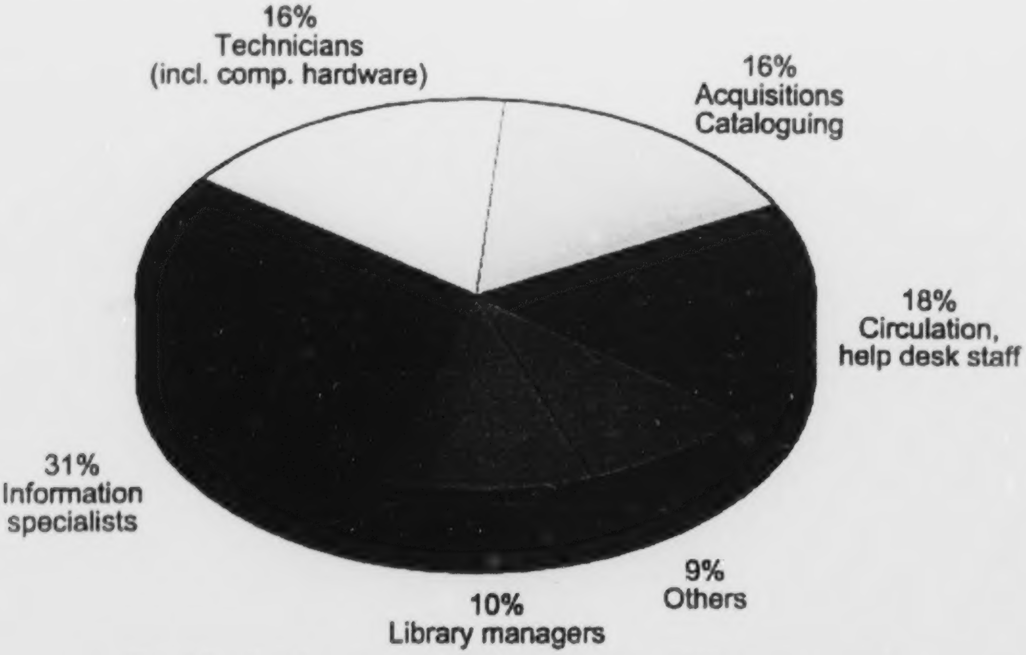

Fig. 6 Predicted percentage of different groups of library personnel

The question on the groups of library users most likely to be trained by library staff (Appendix B, Question 11) proved that, despite possible new groups of users, academic libraries will mainly serve academic community. The three most likely trained groups in the future are:

1. Students
2. Academic staff
3. Researchers

The remaining groups (people from the outside the academic community, present non-users and others) took almost equal places.

The last of the closed-type questions concerned the problem of staff who are unwilling to change (Appendix B, Question 12). Most of the experts have a peaceful and patient approach and offer training as the way of having more benefits from the staff. However, some experts stress that the time offered for training should be limited and if this way fails – other more radical means should be applied.

ANALYSIS OF THE RESULTS

Surprisingly, the results of the first round questionnaire show that it is not the development of information technology or changes in higher education that are considered as the most important factors influencing the picture of the academic library today. The respondents agree that overall financial policy has the most impact on all library activities. What does it mean? Does it mean, that having more money libraries would look, work, be organised, and provide services in a different way? Does it mean that a 'rich' library is, or would be, very different from a 'poor' library in terms of its functions? Paradoxically, no. Richer libraries would build collections and introduce new technologies more easily but we do not think that adequate financing itself would change the image of the academic library to such an extent (and in the way) as progress in IT does. Answers to the questions 1-3 of the second round of the study seem to corroborate this thesis. But in the context of the real danger of splitting a future information society into two groups – a dominant information-rich minority and a powerless information-poor majority, the influence of national information strategies and subsequent level of funding have substantial meaning not only for the library development but even for its existence. On the other hand, most respondents agree that neither growing co-operation between libraries, nor different forms of pressure on governing bodies, may in the next few years result in an increase of funds for libraries. It means that library professionals do not expect any significant improvement in overall library budgets. This in turn leads to the conclusion that the main impact on changing patterns of library services will derive from factors other than funding levels alone. Neither in the past nor in the present have libraries had enough funds. If it had been mainly financial issues that influence change, libraries would never have achieved their present state of automation. Nor would they have developed so many new facilities and services. Therefore we believe that despite levels of funding which will always be insufficient, academic libraries of 2005 will not only survive but also expand their activities. They will get more deeply involved in teaching and education, building integrated collections of different media and managing information. Although our study, reflecting the diverse opinions of the experts, does not entitle us to present the only model of the future academic library, it gives us basis to formulate an overall vision of both the future library and the librarian in the year 2005.

The Vision

The academic library of 2005 will remain "academic" – it will not yet merge with the public library, nor will become part of a regional library. However, it will co-operate closely not only with other libraries of the same type, but also with different libraries and information centres, firstly in the region and subsequently all over the world.

The academic library will continue to fulfil its basic functions, however incorporating into its mission statement some new issues, arising mainly from IT progress and change in higher education patterns. It will depend strongly on the national information strategy and subsequently the strategy of its parent institution, but on the other hand, increased library lobbying will build a better understanding of information management problems and the library contribution among decision-makers of different levels. Neither growing (though still insufficient) awareness of the role of libraries in an information society, nor different forms of pressure on governing bodies will result in significant improvement in library budgets. Therefore libraries will have to look for additional income. It may be achieved through better library marketing within the community, but it will also require the introduction of a wider range of paid services. Essential services related to academic requirements will, however, remain free of charge. Insufficient funds will strengthen the role of library co-operation, which is also a natural effect of easier communication. Consortia-based activities will include such issues as the creation of integrated library networks, common acquisition policies (shared collections), collaborative initiatives to improve access to, and exploitation of, research resources, negotiations and lobbying publishers and commercial suppliers, rights negotiations, finally – the exchange of knowledge and practical information on resources, contracts, suppliers and licence agreements.

Library activities

The academic library will not only serve but also will be deeply involved in teaching and education. It means both intensive and extensive training of users in techniques of data retrieval on the one hand, and involvement in distance learning and other new patterns of teaching and learning techniques on the other.

Judging by the opinions expressed by the experts, individual solutions here will differ significantly: some libraries will merge with academic computer centres, some will remain separate but will engage in the organisation of Internet labs and computer clusters for their users. Some libraries will become deeply involved in preparation of electronic materials for distance students, whereas others will limit their activities in this field to maintaining adequate electronic resources and links. No matter which solution will they adopt, all of them will become more or less involved in both training users in computer skills and distance learning schemes. The most effective retrieval tools will become more and more complicated, as the underlying algorithms will be buried deeply in the software. That is why only experts will be able to guide users in techniques leading to the most satisfactory search results. Teaching and training in data retrieval techniques will primarily involve students, academic staff and researchers. An important group of people to be trained will be the present non-users as well as users from the outside the university (local administration, industry and schoolchildren).

Despite the automation of library processes, the users will expect to receive much support from the library staff. It will be of different type. Students will get assistance mainly in the library or via network services, whereas the staff will expect more individual, face-to face assistance and desktop delivery of information. As it was mentioned before, almost all the users need training. It means that almost 50 % of library activities will be related to information management and training. These new functions will force libraries to increase the number of staff in information services, which in turn will force a decrease in the number of staff in other traditional library divisions. It is forecasted that the structure of the library staff will change (see Fig. 6). Information specialists and technicians (incl. hardware specialists) will form over 46% of the library staff. The number of staff in Acquisition and Cataloguing departments will decrease to about 16 % of all library personnel.

The library will play an important role in the overall university information infrastructure. In the world of ever-growing but dispersed information, libraries will deal both with information processing (adding value) and management (including resource and metadata management). It will also support research through maintaining profiled resources for the local research community and providing individual personal desktop alerting services.

IT progress will lead to the integration of different types of media. The primary goal of the library will remain the responsibility for building of collections suitable for its parent institution. Academic libraries will collect and store all types of documents relevant to their mission. Managing collections will include decisions on shared acquisition policy, balancing holdings versus access, the issues of cataloguing and classification of different types of media, digitisation and archiving of media and making them accessible on the net, and finally preservation issues. The question of quality standards of electronic materials collected and "filtering" technologies will have to be considered at the same time.

As scholarly information grows in volume, libraries will deal with new issues: the assistance in the electronic publishing and archiving of materials produced by staff of the parent institution, but also the fair use of materials protected by copyright, which is not an easy task in a digital environment. Despite many new regulations, which will be in force by that time, legal issues (incl. ownership and licensing) will still apply to important acquisition/archiving problems.

Assuming that the appropriate international standards will be introduced by that time, the interchange of data ought not to be a problem. The service that will be further developed is document delivery.

The academic librarian

The vision of the library of the future cannot be complete without the vision of the librarian of the future. His/her, knowledge and experience, characteristics and image will all in all decide the future of the library. As one of the respondents said, "we need librarians, who feel comfortable wearing a number of hats. The academic librarian of the 21st century must be a researcher, counsellor, planner, manager, assessor, team member, problem-solver and computer-printer repairman". This opinion, shared by most of the experts, shows that the librarian of the future (an average member of the library staff) will be expected to be quite a versatile creature. His/her most important characteristics are very good interpersonal and communication skills, language proficiency, team-working skills, user friendliness and customer orientation. In order to fulfil at least the above expectations and to work with no hope of a reasonable salary, a candidate for the

2005 librarian needs to have really a good sense of humour. Training it's users will be one of the most important services of the user-oriented library, therefore teaching and training skills are essential for the librarian of the future, not to mention both library and IT skills - not only basic but also advanced and even super advanced.

As the nature of contracts is already changing, the future structure of employment will be mainly project-based. New, different tasks and recurrent challenges will require from librarians of the future such characteristics as flexibility, adaptability to ever-changing environments, multi-disciplined and multi-functional skills, team-working skills, finally commitment to profession, without which he/she will not be able to suffer all the stress caused by the work.

Financial issues, technology, standards, legal regulations – these and many more aspects of library work will require managerial, entrepreneurial, analytical skills and a global approach plus leadership qualities and good legal acumen. Finally, it is not enough to have wide library and information knowledge – subject knowledge of at least one area of teaching and research in the institution will be highly appreciated. A person with all the above skills and features ought to be able to imagine futures and work towards them.

Last but not least, one word about library managers. In spite of all the managerial skills required from candidates for directors, most experts agree that they will be library professionals, not typical businessmen graduates from academic schools of economics or business centres.

In order to enable the future library staff to keep up with the pace of change, continual hands-on training, professional courses, seminars and workshops will be organised. Librarians of the future will have to be prepared for life-long learning. Continual professional development will be part of their everyday work. Those who do not feel comfortable facing challenges will have to look for a more comfortable job. Only "the rolling stone gathers no moss".

Final Comments

The rather philosophical question on the limits of library mission to store and make human knowledge available asked as the last one in the second round questionnaire (Appendix B, Question 13), brought natural but still unexpected answers. The response by one of the experts: *"Libraries and librarians should be able to keep pace with the ever increasing technological changes and should be able to adapt themselves as keepers and providers of information, regardless of the form of information"* seems to be accepted by most of the experts as well. This is surprising, because the fast pace of change in many aspects of our lives makes the future less predictable than we might suspect and despite this fact, librarians feel ready for this future. Why? Because they are true Librarians, people so perfectly characterised by another expert:

> *"Essentially, that which draws librarians to their profession is often an insatiable curiosity about their subject interest, information in general, information as it is broadly expressed through the interests of serious researchers and students. Curiosity also makes it possible for people to put up with the frustrations that often accompany their difficult and complicated jobs. It seems that this is a characteristic that is a sine qua non for librarians of 2005 as it is now."*

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Appendix A

Affinity diagram for the issues appearing in the experts' answers to the first-round questions

Question 1 – Impact factors

1. **Finance policy,**
   covering the following factors appearing in the answers: level of funding – different aspects; national information strategy; increasing cost of journals; competition in applying for limited resources; necessity to introduce fee-based services.
2. **IT progress (development):**
   pace of change and related difficulties in keeping up with it; integration of different types of media; growing problems with acquiring well trained staff.
3. **Changes in higher education:**
   increasing number of students; increasing role of distant learning; merging libraries and computer centres; changes in scholarly publishing patterns (incl. print vs. electronic media); growing competition among universities; growing users expectations and demands; "quality" of students.
4. **Co-operation and regionalisation**
5. **Law regulations/public issues:**
   copyright law; intellectual property; legislative policies; legislative status of academic library; recognition of the library and librarian in the society; social status (incl. salaries); media coverage.
6. **Other:**
   bad national library services; quality of library services/accountability.

Question 2 – Library Activities

1. **Involvement in teaching and education:**
   training of users in techniques of data retrieval; training of users in operating PC's (e.g. Windows, basic office applications, Internet access); providing access to the Internet (Internet labs); professional staff training/development.
2. **Information management and information access:**
   filtering and selection of information; operating metadata; adding value to information (processing information).
3. **Building collections and making them accessible:**
   acquisition and processing of media (traditional and new); storage and access to all media; retroconversion.
4. **Managing in general:**
   managing funds; managing people; creating policies; managing licences; dealing with legal and copyright issues; balancing acquisition vs. access.
5. **Creating electronic libraries:**
   digitising/archiving of media and making this form accessible on the Internet; preservation.
6. **Co-operation and resource sharing**
7. **Support for research**
   (also reference)
8. **Social activities:**
   creating a pleasant environment; promoting the ethos of work.

Question 3 – Skills of Librarian

1. **Communication/training skills:**
   language proficiency (stressed mainly by non-English speakers); team-working skills; customer orientation; service needs awareness; user friendliness; public communication skills; good sense of humour.
2. **IT skills:**
   basic: PC, Windows and Internet knowledge; advanced: HTML, web pages design, systems design; library skills / proficiency in information management i.e. knowledge of sources of information and its organisation.
3. **Managerial:**
   project management skills; IT management; time management; business approach; analytical skills; global approach/vision; leadership qualities; good legal/institutional acumen; knowledge of international standards.
4. **Commitment:**
   intellectual curiosity/imagination; commitment to the profession; flexibility/adaptability; multi-disciplined and multi-functional skills; entrepreneurial approach.
5. **Subject knowledge / profiling**

Question 4 – Problems with new technologies / electronic media

1. **Managing electronic information:**
   dealing with the excess of information; long term storage and access; potential loss of material (e.g. licence expiration, poor or no archiving) – especially of online data; reliability and stability of data sources (source management); quality and permanence of sources; interlibrary co-operation in electronic resources acquisition; storage and circulation on national and international levels; organisation/cataloguing of electronic media; acquisition policy (also balancing cost of acquisition/access).
2. **Dealing with pace of change:**
   weak technical infrastructure; connectivity difficulties; low bandwidth; access by "information poor"; changing versions; upgrades (non-financial aspect); lack of standards; growing user expectations; preservation of older types of media and their conversion to new formats.
3. **Legal:**
   licensing; ownership; copyright.
4. **Finance:**
   finance in general; cost effectiveness; balancing costs of acquisition vs. access; financing replacements and upgrades.
5. **People:**
   we – librarians; behaving incorrectly when trying to handle electronic media as books; users' low awareness; need for training; life-long staff training; misuse of services; subcultures of users; users' neglecting traditional materials; plagiarism; human resources; technical staff; finding right people.
6. **Competitiveness:**
   competition with commercial companies; library and IT lobbying.

Appendix B

Questions of the second-round questionnaire

1. As it may be seen from the graph, the level of finances and overall government strategies for libraries have the greatest impact on the current image of academic libraries. At the same time it seems to be the only important factor that may be influenced e.g. by means of library lobbying. **Growing**

co-operation among libraries and different forms of pressure on governing bodies may result in the next few years in significant increase in the level of finances for libraries and improvement in their overall budgets.

2. **Along with library lobbying, which not necessarily will lead to improvement in library budgets, libraries anyway will be forced to find additional income by introducing wider and wider range of paid services and will be seeking for sponsors (perhaps among the industry companies using the services of academic libraries) to cover increasing costs.**
3. **Co-operation** among libraries and tendencies to create regional or "subject" consortia have been noted as one of the factors that influences the vision of the academic library. Although co-operation itself is by many people recognised as forced by the financial constraints, in fact it **is also a natural effect of "disappearing boundaries" and "diminishing distances" in the era of fast and easy communication (both real and virtual). Such effect would appear even at perfect financial condition of libraries.**
4. The educational role of libraries in the future (much more important than now) cannot be underestimated. **Along with training users in effective search for information (which is undoubtful), libraries should be prepared to act also as training centres in PC and basic office software use and provide an open access (for academic community) to the Internet services e.g. by creating Internet labs.**
5. Growing role of distant education generates questions about the level of library involvement in this process. **To be recognised as important in the academic education process, libraries should involve as much as possible also in the organisation of distant learning process by maintaining appropriate web pages, provide scanning services, digitising data sources for lectures, maintaining mail accounts for lecturers and students etc.**
6. Almost 50% of future library activities will be related to information management and training. **These new functions will force libraries to increase the number of staff in information services/departments, which in turn (taking into account limited resources) will force decreasing the number of staff in other (traditional) library divisions.**
7. Most of respondents consider managerial skills and entrepreneurial as extremely important characteristics of the future librarian. Professional knowledge in turn is less stressed. **This may suggest that future library managers will be graduates from academic schools of economy and business centres rather than library professionals.**
8. Interpersonal communication and training skills, as well as good knowledge of computers and software used for managing information will get much more important for library staff. The same concerns information science teachers. The process of merging libraries and computer centres might be then a solution for library's problems with qualified staff. **Creation of Information Services Centres or Learning Resources Centres (joint computer centre and library), the process that has already started a few years ago in some universities, will continue to grow and in the year 2005 most of the academic libraries will be merged with the university computer centres.**
9. Many respondents point out, that the Internet resources are getting more and more unreliable, unstable and misleading. In future its role as a source of information will decrease not only because of difficulties in quality assurance but also because of increasing time of access. Libraries will focus on other electronic media (e.g. sophisticated CD software), treating the Internet mainly as a valuable means of communication. Intranets will be some alternative. **Present librarians' hard efforts to index the Internet sooner or later will prove to be the waste of time. It will remain chaotic as its nature is.**
10. **How the effect described in question 6 would affect the staffing patterns in libraries? Please provide an approximate forecasted percentage of different groups of library personnel (total = 100%)**

    [ ] Library managers (incl. middle management staff)

    [ ] Information specialists (incl. subject librarians in information services and reference

librarians)

[ ] Technicians (incl. computer hardware specialists)

[ ] Acquisitions / Cataloguing

[ ] Circulation / help desk staff

[ ] Others (if significant – specify the group)

11. Training (both self-training and user training) seem to be one of the most important roles of library staff in future information society. **Identify groups of clients most likely to be trained by library staff. Put them in order inserting number from 1 to 6 at the level of each group of users.**
    [ ] Researchers

    [ ] Academic staff

    [ ] Students

    [ ] People from the outside of the academic community (business, industry, local administration)

    [ ] Present non-users

    [ ] Others
12. All basic characteristics of a future librarian (see related graph) are attributes of "young businessman" rather than "traditional library clerk". On the other hand, libraries are still regarded as quiet and nice working places, where many, not necessarily energetic and communicative people, have been employed full time and "forever". Moreover, library is usually not the first and first-choice working place after graduation and people employed are not likely to leave the library, even if they realise they can't cope with new challenges. To make things worse, many of them will never admit that they are not the right persons for the posts they occupy. **The problem of not-in-the-right-place people may be solved by:**
    [ ] firing of "not-to-be-reformed" staff

    [ ] training, training, training

    [ ] natural selection

    [ ] poisoning them slowly but effectively

    [ ] other means (please, specify)
13. Gaining knowledge is the process of experiencing with our senses. The aim of libraries was always to help increasing peoples' knowledge. First they stored books, then magazines, then music records, videotapes, CD-ROMs and so on. Is there any limit for the type of media stored, archived and issued to users by libraries? There are still human senses that can't yet be digitised. What if? Will libraries be obliged to store, archive and make accessible digitised smells, digitised taste? Or digitised emotions? Please make a short comment on this.

Appendix C
List of Experts in the alphabetic order

1. Toby BAINTON, SCONUL (Standing Conference of National and University Libraries) Secretary, London, UK
2. Marvin BIELAWSKI, Deputy University Librarian, Firestone Library, Princeton University, Princeton NJ, USA
3. Simon FRANCIS, Consultant, London, UK
4. Czeslaw Jan GRYCZ, Director, The Poniecki Foundation, Inc., El Cerrito CA, USA
5. Robert HAYES, Professor Emeritus, Dept. of Library and Information Science, UCLA, Los Angeles CA, USA
6. Henryk HOLLENDER, Chief Librarian, Warsaw University Library, Warsaw, Poland
7. Maimunah KADIR, Chief Librarian, University Kebangsaan Malaysia Hospital, Kuala Lumpur, Malaysia
8. Roman KOCHAN, Dean, University Library and Learning Resources, California State University, Long Beach CA, USA
9. Dincho KRASTEV, Library Director, Central Library, Bulgarian Academy of Sciences, Sofia, Bulgaria
10. Ewa KRYSIAK, IT Executive Manager and Coordinator, National Library, Warsaw, Poland
11. Derek LAW, Librarian and Director of Information Strategy, Andersonian Library, University of Strathclyde, Glasgow, UK
12. Elena MACEVICIUTE, Professor in the Faculty of Communication, Vilnius University, Vilnius, Lithuania
13. Di MARTIN, Director of Learning & Information Services, University of Hertfordshire, UK
14. Ian MOWAT, Librarian to the University, Edinburgh University Library, Edinburgh, UK
15. Richard QUANDT, Andrew W. Mellon Foundation, New York NY, USA
16. Margaret ROUSE-JONES, Campus Librarian, University Libraries, University of West Indies, St Augustine, Trinidad and Tobago
17. Heiner SCHNELLING, Head Librarian, Universitas und Landesbibliothek Sachsen-Anhalt, Halle, Germany
18. Anja SMIT, Universitetis Bibliotheek Nymegen, Nymegen, The Netherlands
19. Milena TETREVOVA, Head of Information Department, Technical University, Kosice, Slovak Republik
20. Manfred WALTER, Librarian, Technische Hochschule, Berlin, Germany
21. Terry WEECH, Associate Professor, GSLIS, University of Illinois, Urbana-Champaign, USA
22. Geoff WESTON, Associate Director of Academic Services, Brynmor Jones Library, The University of Hull, Hull, UK
23. Tom WILSON, Research Professor in Information Management, Department of Information Studies, University of Sheffield, Sheffield, UK

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INFORMATION LITERACY COURSES IN ENGINEERING AND SCIENCE – THE DESIGN AND IMPLEMENTATION OF THE DEDICATE COURSES

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1. Introduction

In recent years, technological development within computing and communication has provided the potential for networked distance education courses. The **DEDICATE - Distance Education Information Courses with Access Through Networks - project** is funded under the EU Fourth Framework Telematics for Libraries program. The aim of the **DEDICATE** project is to develop distance education courses in "Training for Information Literacy." The DEDICATE project started in May 1998 and will run until September 1999. The distance education courses will be demonstrated and tested at four sites in Technological Universities in Estonia, Hungary, Latvia and Lithuania and at the International Center for Information Management, Systems, Services, Torun, Poland. This paper will begin with a brief discussion about information literacy and the learning process. This will be followed by a description of the aims and design used for the DEDICATE courses and the running of these courses at the five test sites.

2. What is information literacy

Information literacy can be described in a variety of ways, for example as a series of skills (Bruce, 1997).[1] A distinction can be made between "general" and "subject-related information literacy. The first is related to lifelong learning skills and enrichment of the quality of life and can be applied across many disciplines. This kind of information literacy have been expressed by the American Library Association in "None Information Literacy Standards for Student Learning" – http://www.ala.org/aasl/ip_nine.html [2]

> *"The methods of the scientist would be of little avail if he had not at his disposal an immense stock of previous knowledge and experience. None of it probably is quite correct, but it is sufficiently so for the active scientist to have advanced points of departure for the work of the future."*

J.D.Bernal, Science in History, 1971 [3]

Subject-specific information literacy has additional dimensions, and is closely related to the pattern of information flow within that discipline. In the physical and natural sciences, medicine and many engineering subjects, the flow of published information has been described by the Garvey-Griffith model, which showed that different information channels and sources are suitable for different information needs (or problems). [4] The original model can be modified to include more recent forms of electronic communication (Hurd et al, 1996). [5] The process of information searching varies depending on the information needs of the user. Allen pointed out that the needs of individuals working on projects varies as the project progresses (Allen, 1977) [6]. User needs and related information searching practice has been studied by a number of researchers during the last ten years, examples are by Palmer, 1991, [7] Kulthau, 1991, [8] Ellis et al, 1993, [9] Wilson, 1994, [10] Ingwersen, 1996, [11] Ellis & Haugen, 1997, [12] and Limberg, 1998. [13] The actual context or task strongly influences search behaviour and may well influence the learner´s perception of information literacy. This is particularly relevant in education today where there is much emphasis on problem-based learning. Information seeking is, however, rarely an isolated event, but can be seen as a cyclic process which is carried out in a number of successive searches throughout learning and/or project work.(Wilson, 1998) [14]. The perceptions of information literacy can be expected to change throughout these processes.

3. Approaches to learning

Many of the earlier models for teaching user education were based on the teaching process (Fjällbrant, 1984, Eisenberg & Berkowitz, 1990, Huston, 1991, Kulthau, 1993). [15] [16] [17] [18] Currently in higher education, emphasis has shifted from teaching towards facilitating learning. Learning can be described as a process of change in which the process and the outcomes vary in different people. Students' approaches to learning describe the way that they set out to tackle a given learning task or piece of work. One important concept in research in student learning is that there are different *approaches to learning* – for example experiential or theoretical. The approach can also vary with the type of task that is the approach is context-specific. In the 1970s, group of researchers led by Ference Marton at the Department of Education and Educational Research at the University of Gothenburg, started to explore and describe ways of conceptualising and learning a topic. Emphasis shifted from measurement of the *quantity* of material learned to the *quality* of the learning (Marton, 1981). [19] This research approach is called *phenomenography*. It is based on, in the first instance, a set of qualitatively distinct ways in which students conceptualise the *phenomena* that they are learning about. Marton (1993) defines a phenomenon as "the logically structured complex of the different ways of experiencing an object." [20] Rather than looking at how students solve a problem, say by the use of equations representing Newton's Laws, the phenomenographer studies how students conceptualise the Laws.

Learning is measured in terms of the quality of understanding and its relevance to the learning situation. It is based on the assumption that knowledge is relational, where the relation is between the knower and the object. This provides valuable insight for the teaching/learning situation which is dependent not only on the knowledge of the lecturer, but also on the way in which that can be experienced by the students.

In 1979, Roger Säljö carried out a study, based on interviews, which led to the description of five conceptions of understanding of learning:

1. Learning as a quantitative increase in knowledge. Learning is acquiring information or "knowing a lot."
2. Learning as memorising. Learning is storing information that can be reproduced.
3. Learning as acquiring facts, skills, and methods that can be retained and used as necessary.
4. Learning as making sense or abstracting meaning. Learning involves relating parts of the subject matter to each other and to the real world.
5. Learning as interpreting and understanding reality in a different way. Learning involves comprehending the world by interpreting knowledge (Säljö. 1979) [21]. A sixth conception can be added to the first five:
6. Learning as changing a person, where the learner sees that there are different ways of seeing a given phenomenon - a multifaceted world (Marton & Booth, 1997) [22].

The conceptions in the latter three categories are qualitatively different from the first three, in that they are more complex and are connected with meaning, understanding and perceptions of phenomena. They emphasise the personal aspect of learning in which learning is something that you do in order to be able to understand and relate to the real world. The concepts in the first three statements have been described as related to *surface learning* as opposed to those in the last three statements which have been linked to *deep learning*. The latter implies understanding and facilitates retention, whereas matter that is acquired by surface learning is soon forgotten. A deep approach to learning is linked to the quality of the learning responses.

What kinds of course design and strategies can we, as course designers, choose, in order to help our students with their studies? How can we encourage a deep approach to learning? There are a number of ways in which learning can be stimulated:

1. **Motivation** when there is an interest to carry out the given task or project. In the DEDICATE courses the participants, who are adults, will have a greater interest in learning if they feel that the task is relevant to their real life situation.
2. **Activity** - active work on for example, a problem, or a text, where participants are encouraged to reflect and construct their own meanings.
3. **Interaction** - where students are encouraged to interact with others (both students and tutors) in order to discuss and reformulate their ideas.
4. **Feedback** - information on the progress being made should be available to participants - this can be provided partly through interaction and partly by formal assessment activities.
5. **Knowledge-base** - access to a well structured knowledge base is a very valuable cognitive input which can act as a starting point for learning activities.

In the DEDICATE courses we are addressing distance learning and here there is an important addition - the need to provide support of an affective kind for participants who might well be working in relative isolation. Not only must we facilitate interaction for the discussion of meanings and theories and phenomena, we must provide support for students who can feel uncertain and confused in their learning roles. Adult learners have a complex background. In a typical adult learner group, the following variables can differ: educational backgrounds, socio-economic factors - family situations pressure of work at home etc., organisational context and learning environments, motivation and conceptions of learning. The student's conception of learning is of considerable importance, as has been pointed out by Laurillard, because this is the way that they believe that they can come to know (or learn). (Laurillard, 1993). [23] A model of student learning has been presented by (Morgan, 1995) [24] in a book about Open and Distance Learning Today, which shows how these various parameters can affect the learning outcomes. This serves as the basis for Figure 1.

Fig.1.
Learning
model

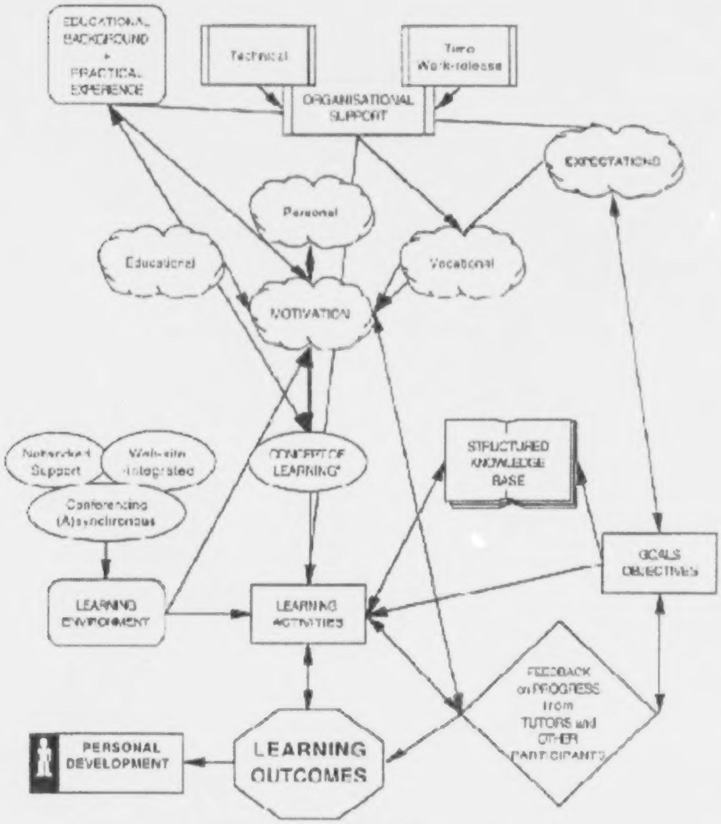


Fig.1. Model of Student learning

In designing courses it is necessary to try to provide situations which facilitate the learning process, taking into account that participants (and teachers) are individuals with different starting points and requirements. A key feature is to try to stimulate students motivation. In order to plan for distance learning courses it is important for the teachers to find out as much as possible about the backgrounds of the participants: their expectations from the course, their educational background, their working conditions - institutional support - and, if possible, their conceptions of learning.

4. The DEDICATE courses – Training for Information Literacy

The aim of the DEDICATE project is to develop distance education courses in "Training for Information Literacy." This will be achieved through training the trainers – giving librarians and academic staff an opportunity to experience and reflect about their own ways of looking for information, then moving from this to study information literacy and design courses suitable for their own organisations. The aim of the DEDICATE project is to produce courses related to the needs of individual students as well as to those of their institutions.

DEDICATE courses are based on the use of the Internet and the World Wide Web. Communication between individual participants and tutors, and within participating groups has been supported by means of electronic conferencing software. In this type of interactive distance course it is extremely important to provide networked user support and in the DEDICATE course design special attention has been paid to the needs of the participants in this respect. Cognitive learning support has also been provided through the use of the *Into Info* programs, which have been derived from work carried out during the EU Telematics for Libraries EDUCATE project. [25] Support has also been available for participants in the form of document supply.

5. The DEDICATE courses - organisational context

In the case of the DEDICATE courses, participants will be taking part in professional continuing education about how to design Information Literacy Courses for Library Users in the Higher Education Sector. [26] It is extremely important to see that this work, which will involve people in time-consuming study, has the support of the Library Managers at the institutions concerned. This is important for a number of reasons:

1. The possibility to produce a real useable course - for the institution will be a highly motivating factor.
2. The participants will have to work hard and it is desirable that some period of work-release be granted each week.
3. It is necessary to know that the students will have access to technical support - equipment necessary for participation and help from a technician if this is necessary.
4. The interest and support of the Library Managers for their local participants can really act as an encouraging factor.

To this end a Questionnaire for Institutional Managers was produced and sent out to the Library Directors from the 5 CEE sites:

Tallinn University of Technology - Estonia
Veszprém University - Hungary
Riga Technical University - Latvia
Kaunas University of Technology - Lithuania
Nicholas Copernicus University – Poland

prior to the DEDICATE Start-up Meeting in May 1998. All institutional managers agreed to provide between 4-6 hours of work-release time for the duration of the course. The Timetable for the course was discussed, with respect to causing minimum disruption of library. Access and use of technical equipment was guaranteed, together with any necessary technical support.

6. The participants and their expectations

As mentioned above, in distance learning courses it is important for the teachers to find out as much as possible about the backgrounds of the participants: their expectations from the course, their educational background, their working conditions -institutional support - and, if possible, their conceptions of learning. This is very important for being able to provide student support during the distance learning course. [27] For this purpose a Participants Questionnaire was designed. This questionnaire was presented at the initial DEDICATE Course Start-up Meeting at each site (see Section 8, Unit 1). Participants were asked to take time to reflect on their expectations - why they were doing the course, and what they hoped to get out of taking part, and to express any concerns they might have about it. This was followed by a discussion between participants and their DEDICATE tutor(s). Later participants were asked to fill in an electronic form about their personal goals. It was important to see that there was no conflict between the individual goals and those expressed by the institutional managers.

7. The learning environment

The learning activities of students, in higher education, have been described by Laurillard in terms of five interdependent aspects of the learning process: [23]

- **apprehending** the structure of the material. interpreting the structure and organising as a coherent whole;
- **integrating** the representation of the material with the meaning, for example using language, mathematics, classification systems;
- **relating** knowledge to experience, relating theory to practice;
- using **feedback** - both intrinsic and extrinsic - to adjust actions to fit the task goal and descriptions to fit the topic goal;
- **reflecting** on the goal-action-feedback cycle.

Ideally the learning process should take the form of an interactive dialogue between teacher and student, where both are in agreement on the learning goals for the topic.

The DEDICATE courses started with an initial face-to-face start-up meeting between the participants and their tutors. Tutoring and technical support was distributed geographically. Members of the support team were located at Chalmers University and Linköping University in Sweden, Helsinki University of Technology, Finland and Sheffield University, UK.

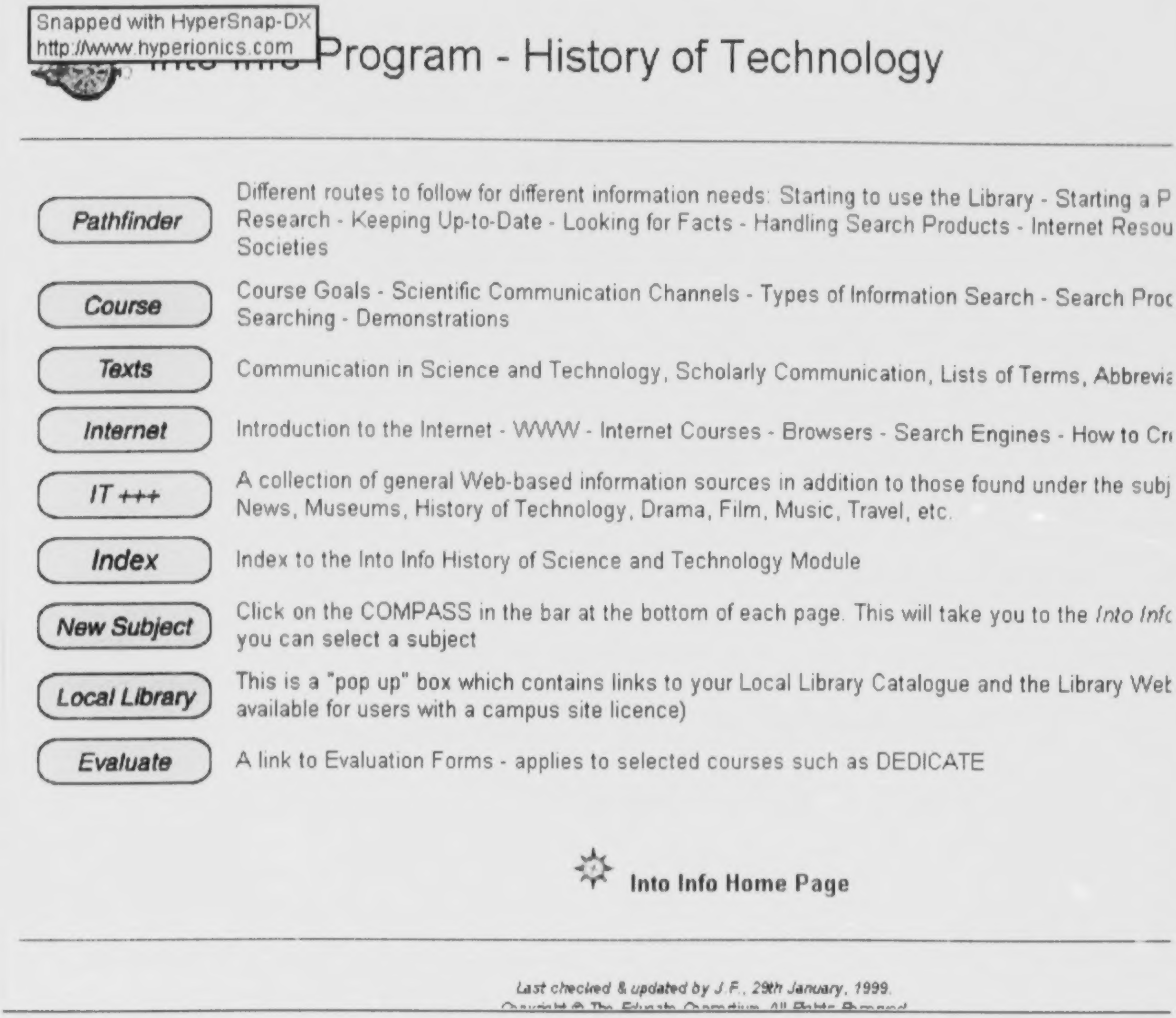
A key concept underpinning the technical environment for the course was that it should support active, collaborative and independent learning, and be perceived as far as possible by the user as an integrated Web application, offering easy and rapid access to a distributed range of facilities and resources. Key features of the interface, facilities and resources of the DEDICATE course were based on a frames-based Web environment, offering easy orientation and navigation within the DEDICATE course site. This was based on the design used in the NetLinks Project, at Sheffield University Department of Information Studies, under the UK e-lib programme. [28] [29] [30] The interface provided access to:

- the 5 Units of the Course (see below);

- a structured knowledge base - the Resource Base. This was structured so as to include the "essential" required reading for each Unit. In addition a subject based resource base of items was included. This division between the most important resource material and other material which can be useful for some projects has been introduced in order to avoid overwhelming participants with resources;

- asynchronous conferencing facilities for group discussion and tutorial and/or technical support. The main discussion facility for the course was *Focus* - an electronic conferencing software program, developed in the UK. [31] One discussion group took the form of a casual meeting place - the DEDICATE Café. A General Discussion Forum was available, as well as forums for each group to stimulate discussions and interactivity between the participants and between participants and tutors. In addition there were centres for discussion of technical and information issues;

to the Web-based *Into Info* programs developed on the basis of work carried out in the EU Telematics for Libraries project EDUCATE. [25] [32] *Into Info* programs were used to provide cognitive subject support about information patterns. Currently the *Into Info* programs are available in the following subject fields: Architecture, Chemistry, Electronic and Electrical Engineering, Energy, Environmental Information, History of Science and Technology, Physics and Medicine. The *Into Info* programs are based on an initial hierarchic structure on three levels, with many internal and external hyperlinks, so that users are free to follow their own needs and choices. The first level of the hierarchy offers seven alternatives (see Figure 2).



Snapped with HyperSnap-DX
http://www.hyperionics.com

Program - History of Technology

Pathfinder	Different routes to follow for different information needs: Starting to use the Library - Starting a P Research - Keeping Up-to-Date - Looking for Facts - Handling Search Products - Internet Resou Societies
Course	Course Goals - Scientific Communication Channels - Types of Information Search - Search Proc Searching - Demonstrations
Texts	Communication in Science and Technology, Scholarly Communication, Lists of Terms, Abbrevi
Internet	Introduction to the Internet - WWW - Internet Courses - Browsers - Search Engines - How to Cr
IT +++	A collection of general Web-based information sources in addition to those found under the subj News, Museums, History of Technology, Drama, Film, Music, Travel, etc.
Index	Index to the Into Info History of Science and Technology Module
New Subject	Click on the COMPASS in the bar at the bottom of each page. This will take you to the *Into Inf* you can select a subject
Local Library	This is a "pop up" box which contains links to your Local Library Catalogue and the Library We available for users with a campus site licence)
Evaluate	A link to Evaluation Forms - applies to selected courses such as DEDICATE

Into Info Home Page

Last checked & updated by J.F., 29th January, 1999.

Fig. 2. Into Info approaches

8. Course overview
Experience from previous distance education courses such as INFOVISION and the NLS Programme have demonstrated the need for very clear and non-equivocal material. This is particularly the case when participants are having to work in a language other than their mother tongue, A Course Overview was prepared to introduce the course:

BEST COPY AVAILABLE

1. Background - the need for education in information literacy
2. The DEDICATE project
3. Aims and objectives of the DEDICATE Course
4. Timetable and planned activities
5. Course approach and material
6. Equipment and software
7. The forms of examination
8. Evaluation
9. Address to the DEDICATE homepage: http://educate.lib.chalmers.se/DEDICATE/dedindex.html

9. The learning modules - Units 1-5
Course material has been divided into 5 Units:

Unit 1 - The Internet as a learning environment - introduction to the technologies
Unit 2 - Search for information in a selected specified subject area
Unit 3 - The institutional context - reflection, planning for the design of an information literacy course
Unit 4 - The design of an information literacy course for a specific user group within the institution
Unit 5 - Learning review and course review

A similar structure was used for each unit with aim of simplifying navigation for the participants.

In the first unit participants became familiar with using the network technologies and communicating with each other, and in general developing their information technology skills. Next came Unit 2 which aimed at providing participants with experiential learning in information searching and evaluation. This in turn provided some experience for the choice of a suitable Information Literacy course for the paticipants´ own institutions, a subject for reflection and negotiation in Unit 3. Unit 4 was for the team design of the chosen course, with access to expert consultants at all stages. Unit 5 will be a time for reflection and discussion about learning outcomes and for evaluation of the DEDICATE Course.

Great care was taken to make the instructions as clear as possible, for example by including Check Lists and details about the Reporting required. The Units were pre-tested by a "guinea-pig" student who had Swedish/Finnish as her first languages. The examination form was sometimes individual and sometimes based on group work. The latter has been used primarily to encourage discussions and reflections - as there are, in many situations, many possible ways of answering a given question.

10. Evaluation
Formative evaluation has been carried out throughout the course, by means of discussions with respective course tutors. It has been noted that one of the advantages in distance and/or flexible learning, is the possibility for individual students to have far more interaction with their tutors than in the "traditional classroom" situation. This has been commented on by many of the participants and tutors. The summative evaluation of the course will take place in connection with Unit 5. A feature of this will be the assessment of personal learning outcomes by the participants themselves. A web-based questionnaire has been constructed and will be used for part of the summative evaluation. A final "evaluation of outcomes" report will be written three months after the end of the project.

At the time of writing, the first three units of the course have been completed, and the participants are well on their way to designing courses for use in their universities. Examples of these proposed courses are:

Tallinn University of Technology, Estonia. Information Literacy courses for postgraduate students in Computer and Systems Engineering, and Electronics and Biomedical Engineering Control. The course will carry University credits and is planned for implementation in Spring 2000.

Veszprém University, Hungary. A course in Information Literacy in connection with Environmental Engineering studies. This will be given for third year undergraduates taking a five-year course. Information searching will be directed towards environmental protection, in connection with problems of hazardous waste and air- water- and soil-pollution.

Riga Technical University, Latvia. An Information Literacy course for third year undergraduates in Chemistry and Chemical Technology, planned for the autumn term of 1999, and an Information Literacy Course for second year undergraduates in the Faculty of Radio-engineering and Telecommunications, also planned for autumn 1999.

11. Discussion

In view of the rapid changes that are taking place in information transfer and the increasing variety in ways and forms of access, many users face uncertainty in information seeking and handling. There is a very real need for the development of information literacy training in European countries. The networked courses developed in the DEDICATE project appear to offer a very suitable form for professional development. One particularly interesting feature is the joint training of librarians and academic staff, that has been implemented at most of the sites. This would appear to lead to a valuable link between the library as an information provider and the parent organisation. In those courses where the two groups have been involved, it has been shown that there are advantages in the development and integration of new information literacy courses into the academic programme of the universities. It is to be hoped that it will be possible to continue this work of Training the Trainers in future years, thus realising the full potential of this European project.

IATUL members are encouraged to follow progress through the DEDICATE Newsletter at:

http://educate.lib.chalmers.se/DEDICATE/news.html

This describes DEDICATE dissemination activities. You may wish to note that a DEDICATE seminar is planned for September, 1999 at the ICIMSS, Torun, Poland. Librarians interested in the implementation of courses similar to the DEDICATE Training Courses are invited to contact the authors of this paper.

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IATUL

NEW REFERENCE: DIVERSIFYING SERVICE DELIVERY

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Introduction

A new strategic direction for an organisation involves a process of planned change. The reference librarians at The University of Western Australia (UWA) have recently emerged from such a change process that focused on the delivery of reference services. This paper aims to describe the experience.

Over a period of five years the reference librarians had become increasingly involved in delivering a diverse mix of services and resources. Their role had increased in complexity and it placed pressure on them to maintain traditional reference desk services while accommodating new activities such as web authoring and delivering information literacy programs.

They had been considering the future of reference services for some time. The reference librarians had engaged themselves in activities such as writing a discussion paper on the "Future of reference services", attending seminars run by Anne Lipow on "Rethinking reference" and Arnold Hirshon on "reengineering reference", and holding their own workshop on redesigning their reference operation. They recognised the need for change and established what they wanted to do but then found it difficult to actually take the first steps to implement their plan. Time passed and resistance to the change grew and doubts about their future direction emerged.

Resistance to change is a common response even when the change is self-initiated. Individuals often feel insecure or anxious, leading to resistance or inertia. In part this explains why the reference librarians had difficulty taking action to change their role. Leadership is also an important aspect of effective change management. The reference librarians had progressed as far as they could without external direction. It was therefore decided to facilitate the reference librarians through the change process.

Reviewing the Literature

The literature on rethinking reference services identified from LISA at the time illustrated that the concept was not new. Since the 1980s the cost-effectiveness of reference services in university libraries had been questioned and in particular the inherently inefficient service delivery method centring on the reference desk. Using technology to automate reference questions was seen as one approach to becoming more efficient. (1) Other studies recognised that many questions answered at reference desks required low-level responses. (2) By the early 1990s articles appeared reporting the demise of the reference desk. For example "The Main Library at Brandeis University eliminated its reference desk in 1990. (3) and the development of differentiated reference services started to occur in some libraries. (4) Overall studies recognised the high cost of the traditional desk based model, the lack of control over the work to be performed and the inflexibility of the service. However these developments were mainly being reported from academic libraries based in North America.

Background

The UWA reference service comprises staff situated in nine subject libraries distributed across the campus.

Each subject library has from one to three reference staff. The reference librarians report to a librarian who manages each subject library. The reference librarians also meet as a cross sectional team to discuss reference related issues. The problem that faced the reference librarians was that they felt they could not fulfill all their duties while working from the reference desk in their subject library for a significant period of time each day. In subject libraries with only one reference librarian they could spend all day working on the reference desk. They wanted time away from the desk to undertake other duties. These included time to prepare and deliver information literacy classes and to develop and maintain electronic resources for the Library's web site *CygNET Online*. They also wanted to respond to indepth reference questions in a profesional manner away from the public desk where the demand for answers to directional and basic information questions and telephone queries were a continual interruption.

Reference seminar series

In order for them to address the problem, a series of seminars were arranged by an external facilitator. A total of four sessions were held, however planning the changes was difficult and progress was slow. The seminars became sidetracked at times and in the end failed to identify actions that would make significant changes in reference services. The activities designed to re-position reference services stopped short of actually making changes to the traditional delivery of reference services from the desk.

The reference staff had been encouraged to consider alternative service delivery models for themselves but they had not been directed to make changes. In retrospect the awareness raising activities took too long. Also it may have been unrealistic to expect that the staff involved in the delivery of traditional reference services could make the decision to change. It was therefore at this point that senior staff intervened to advance the discussion into action.

The Project

The aim of the project was to address the concerns that the reference desk model of service delivery was no longer the most efficient and effective method of meeting client needs. The methodology was based on action research that has been applied in many contexts to enable staff involved in a change process to decide on the course of action that leads both to improvement and to evaluation of the results.

The action research model was originally used by Kurt Lewin in the 1940s as a strategy for change, and his work has been cited frequently in the action research literature by authors such as Clark (5), Kemmis/McTaggart (6), Zuber-Skerritt (7) and Stringer (8). The process involves a series of spiral steps composed of planning, action, observation and reflection. While there are many variations on the action research model all involve a similar set of stages. The *Action Research Planner* (6) outlines the four stages of the process as follows:

- develop a plan of action to improve what is happening
- act to implement the plan
- observe the effects of the action
- reflect on these effects as a basis for further planning.

The project followed this general approach.

Developing the Plan

The objective was to enable reference staff to respond to changing client demand for reference services in the electronic environment.

Information gathered before and during the planning phase indicated that only 22% of questions addressed to reference staff required a professional librarian's expertise. The majority of questions asked both in person and on the phone were either directional or basic inquiry questions. This statistical information is widely supported in the library literature and certainly is not unique to UWA Library. It suggested that answering reference questions could be managed differently. Subject libraries were designed with two desks – a loans desk and a reference desk. Clients often didn't understand the difference between these two service points. It was decided to amalgamate the reference desk and the loans desk to form one service point that would act as an initial inquiry point for all clients. The Loans staff would staff the inquiry desk, releasing the reference librarian from the reference desk to work from a reference office. However this would create changes not just in the delivery of reference services but also for loan services and the staff involved. The question was how to provide additional resources to support the inquiry desk staff?

The planning process considered people factors such as the changing role of the loans staff who would find themselves faced with a very different role working on an inquiry desk rather than a loans desk. Also the reference staff would need to consider how to deliver reference services without a desk. And what of the clients - would they notice a change in service?

The change to an inquiry desk model of service required the support of all staff involved in the process and so it was decided to trial the model in one subject library on a temporary basis in 1997. Trialing the inquiry desk model in one subject library kept the number of library staff involved in the initial changes quite small. Staff involved in the trial kept a record of the changes and their effects – both positive and negative. They also identified their resource requirements. For example an Inquiry Desk Help File was compiled by the reference librarian to assist with frequently asked questions. Guides were developed to assist clients access electronic resources directly on *CygNET Online* to reduce the number of questions at the inquiry desk on how to locate the electronic databases. A training program was devised for the library officers on questioning techniques, and a PC replaced the terminal on the inquiry desk to provide direct access to *CygNET Online* for inquiry staff. The training program was not designed to turn loans staff into reference librarians. The role of the library officers was to enhance the services they provided by having the skills and experience to know what questions they could answer and what to refer to the reference staff. The reference librarian was available to provide a personal reference service to clients in an office environment although still visible to the inquiry desk staff and clients via a glass wall. The emphasis was on team work. The library officers and the reference librarian worked towards the same goal of providing services to support academic staff and students with their research and learning.

Action – The trial

The first trial was monitored and it was immediately apparent that workload had transferred from the reference librarian to the library officers.

Observation indicated that changes were required. The library officers discussed their concerns openly and operational decisions were reached through consensus. The staff developed a strong interest in the success of the project through this involvement.

Reflection confirmed that library staff were on the right track with the overall changes they were making but the workload problems required action.

The revised Plan

Therefore a second cycle of activities was planned. The new approach introduced an additional strategy – self service. Self service was to be used to deliver services that could be managed by the clients themselves. Initially this involved the introduction of a self checking machine for general loans. Help Desk files were developed to assist clients at the workstations, signage was improved and an open reserve was planned.

At this point a significant and symbolic action marked the ongoing commitment to the changes. The reference desk was physically removed from the Library. The reference librarian moved permanently into an office and the inquiry desk became the single service point.

By the beginning of 1998 the trial was over and the new reference service was operational in the first subject library. The changes included one service point, a self check loan machine, open reserve, better signage and guides and most significantly a change in the way both library officers and reference staff worked together as a team to deliver client services.

The staff recorded the impact of the changes in service. Among expected changes they identified were:

- Improved services for clients where many queries were resolved at the first point of inquiry;
- Increased confidence by library officers in their ability to answer more advanced questions
- Reference librarian freed from the tyranny of the Desk
- More interesting work for both library officers and reference staff
- Reference staff able to spend more uninterrupted time with clients in need of advanced reference assistance, web authoring and delivering classes.

Unexpected changes included:

- Library officers felt more confident in referring clients to the reference staff when appropriate because they had a better understanding of the sorts of questions they were able to answer
- They had options in attending to clients' needs either directly, through referral to the reference librarian or by having an appointment book to offer advanced bookings for students with the reference librarian
- The networked PC installed on the inquiry desk provided direct access to *CygNET Online* where previously the Loans staff worked with terminals and referred even straightforward queries to the reference desk because they lacked access to the network.

Based on the success of the trial which took place in the Education, Fine Arts & Architecture Library (EDFAA), two additional subject libraries joined the program to discard their reference desk in 1998 – the Law Library and the Maths and Physical Sciences Library. In 1999 two more libraries have followed – the Business Library and the Biological Sciences Library. To date there has not been one complaint from clients regarding the disappearance of the reference desk!

Tiered levels of service

The changes in the delivery of reference services had far reaching consequences for the provision of client services and led to the development of a three tiered level of service – self help, inquiry and reference services.

Self Service

Self service has increased and now includes a publication program of information booklets and guides, plans for an improved signage program developed by professional sign planners, electronic delivery of information literacy programs through the Library's InfoPathways information literacy program, development of electronic exam papers, self check machines in more libraries, open reserves in more libraries, self help loan services such as placing recalls on materials directly on the system.

Inquiry Services

The inquiry level service includes a series of electronic forms on *CygNET Online* to enable clients to request document delivery services, request store materials and an "Ask a reference librarian" service. A Telephone Inquiry Service (TIS) has been introduced in response to the number of general queries received at both reference and inquiry service points. This service has proved to be an outstanding success in its aim of reducing the number of calls that were dealt with previously at the desks. It has had other very positive outcomes that could be the topic of another paper.

Reference Services
The reference staff, working in an office environment, report that they now can offer innovative and flexible services to meet the changing demands of library clients.

Conclusion
The changes made to accommodate the needs of the reference librarians led to widespread changes in client service. Staff came to recognize that self service activities are a legitimate method of effecively and efficiently delivering library services. The introduction of inquiry desks and a telephone inquiry service have changed the role of the library officers from 'loans' staff to staff with a direct role in delivering information services to clients. They report enthusiastically about the more interesting work they can do now that loans have become a self service activity. The reference staff achieved their goal, eventually, of providing a range of professional services in an appropriate environment.

By the end of 1999 the aim is to have implemented an inquiry service in all but one of the subject libraries at UWA.

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I certify that this is an original paper and has not been copied from, or published, elsewhere.

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IATUL

A KEY TO THE NEW LIBRARY

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INTRODUCTION

It is generally accepted that previously successful organisations and institutions can no longer rest on their laurels. They must renew themselves. Models that have been successful in the past are getting obsolete. New methods of organisation must be invented. This is also true of library and information services in particular. The librarian must find the key to a new library to ensure its future. It is, however, extremely difficult to walk the talk. To build a battle plan for creating the new library, implies more attention to intangibles than ever before. An alignment between strategy and action plans on the one hand and the social dimension of organisational culture and leadership on the other, is extremely important. The real challenge is to accomplish alignment between strategy and people. A human resources development plan and business strategy must be aligned. A commitment to change and renewal and a culture of organisational learning, must be developed and managed. The traditional boundaries of the library are now blurred by networking, alliances and joint ventures in the international information business. Many libraries lack a vision of their future and demand leaders who can transform vision into reality.

Librarians are faced by the challenge to remain players in the game. If they pay attention to what is changing today, they will know what they must do better tomorrow. Without vision the librarian as a leader can not take his people to a new destination. It is equally true that the first responsibility of a leader remains to define reality. One side of reality is that the future will continue to change; the other is that we cannot stay the same. "The foundations of librarianship are shaken by the current shift in the information environment, and, indeed the change is revolutionary. It is not a matter of new forces taking over an existing power structure; this is a real revolution in which the entire structure is rebuilt." [1]

MANAGEMENT PHILOSOPHY FOR RENEWAL

Although libraries might comfort themselves by their strategic planning being done; it should be kept in mind that the outcome of many strategic planning exercises is influenced by past experience; which might not be relevant to the immediate future. On the contrary, the success of the library is determined more by its ability to change, than by its successes of the past. The key to the new library implies that the inflexible hierarchical pyramidal structure with its functional orientation, should be replaced by a network organisation with a service and competency management orientation (figure 1). Furthermore, the success of the renewal plan is outcomes based and will therefore require the mastering of new and relevant competencies and skills. The development of new competencies and skills implies the design of an outcome and competency based compensation system. It can not be expected of staff to develop new competencies and skills, unless a compensation and reward system is in place to acknowledge and reward relevant achievements.

Another key element in a philosophy and framework for renewal is the creation of teams with full client-directed process ownership. The team takes full responsibility for a process from the determining the client's needs, specifying products and services to evaluating client satisfaction. It involves role descriptions (not task descriptions) cleared out in teams and among others, multi-skilling, leadership through expertise and control through alignment with an internalised vision and value system. The team-based approach has implications for the design of the compensation system which must also make provision for team rewards.

The key to unlock a new future lies in a dynamic fruitful partnership between library and clients. An affordable differentiated service supporting the strategic focus areas of the institution needs to be cleared and contracted with clients.

Successful renewal depends on provision being made for competency based human resource development. Without a staff developing and applying the new relevant competencies and skills the library can not manage change successfully. This investment in intellectual capital presents new challenges in risk management. Good care should be taken to prevent loss in leadership and competent staff.

A wider perspective on leadership is needed. Leadership potential must be identified and exploited to the full. The way in which leadership is accommodated and exercised may, however, not result in a new disguised hierarchy. Leadership must be achieved and acknowledged through proved expertise.

Successful renewal management philosophy. Mechanisms and structures like the following must be activated and will be discussed briefly:

- the careful construction of a strategic framework;
- identifying a core strategy;
- developing a three-year-picture or scenario of what the library should be within the next three years;
- designing a three year renewal plan to realise the future picture of the library.
- using the balanced scorecard to ensure a well balanced management approach;
- designing an outcomes competency based compensation system.

STRATEGIC FRAMEWORK

The first step towards renewal of the library is to construct a strategic framework. The term strategic framework is preferred because the traditional strategic plan has the notion of being strict and fixed as spelled out on paper. The strategic framework on the other hand reflects the strategic mode of thought and invites continuous updating of strategic perspectives and actions. A strategic framework for the new library covers issues like the following: (figure 2)

- a strategic focus which can be to ensure excellent virtual access to information and to cultivate effective personal and general information and knowledge management practices;
- a core strategy to sharpen judgement regarding the relevance and primary importance of various issues such as the regeneration of the library towards a virtual information service;
- strategic focus areas like the creation of information services and products in an innovative manner; the optimalisation of human potential and organisational climate and culture, the re-engineering of internal work processes, the radical transfer of resources, etc.;
- a main or driver strategy which will ensure that the core strategies of the parent institution are accounted for; for example integration with telematic teaching and a virtual campus;
- general strategies like marketing, information technology, management, alliances et. and finally
- team strategies to put the strategic framework into operation. Luckily people need not to be in the same place if they are to work together. The new organisation is made up of virtual teams and networks of teams. According to the strategic focus involved, teams can be put together by representatives from various departments; even from outside the library. (figure 3)

CORE STRATEGY

A core strategy for the new library will in one way or another be linked to the idea of a virtual information service. (figure 4) The transformation of the traditional library to a virtual information service implies the development of various **mechanisms** to initiate and drive the necessary action. They include the availability of information technology literate staff; the redesign of services, getting service and support units in place and design and implement corporate strategies and projects. An appropriate information technology driven **infrastructure** must be in place to implement a strategy of access to versus **ownership** of information; to integrate electronic and paper-based information sources and to allow for web delivery of services. The **results** of the core strategy are *inter alia* the integration with telematic tuition and faculties, self-help services, integration with research process and IT and information literate clients.

THREE-YEAR-PICTURE

The strategic framework and core strategy clear the ground for drawing a three-year-picture for the library. However, the picture can only be drawn if the strategic framework and core strategy also express the real meaning of the library clearly. The meaning of the new library lies in its ability to facilitate clients in personal information and knowledge management practices. As far as information management is concerned, the information scientist can assist the identification and use of differentiated information sources and services, can activate appropriate delivery mechanisms, index, organise and retrieve information collected, etc. The challenge and role of the library in knowledge management is, however, a neglected key to the future of the new library. The professional expertise of information scientists as staff of the library is extremely relevant for institutions which now have to manage knowledge effectively if they want to be competitive.

"The Internet reveals Knowledge Management (KM) as one of the hottest management topics on companies' agendas. A recent search showed more than 37 900 web pages and 266 books taking aim at the subject. Add to that the conferences, consortia, societies, think tanks, and magazines dedicated to KM, and the theme's popularity throughout the business community is undeniable.

> .... knowledge has become the currency of competitiveness and success." [2]

The ability of an institution to organise and communicate knowledge seamlessly, both internally and externally (even world-wide) is now a critical competitive factor.

Time does not permit to explore the relation between the library and knowledge management, but the challenge of finding the key to the new library can not be addressed without pointing out that a window of opportunity exists and dare not be missed.

The library is already stripped of many activities which used to be an integral part of its professional framework. Survival is now linked with a new vision and role for the new library. The library can facilitate the institution in its challenge of knowledge management which covers *inter alia* the capturing, packaging, indexing and leveraging of relevant, useful information about things that are important to the organisation also - the knowledge of personnel. Such organisational knowledge must be available for use and re-use by people throughout and in other places and contexts in the organisation. The new library must manage contemporary information practices and facilitate knowledge management practices to support the institution in pursuit of excellence and relevance.

RENEWAL PLAN

When translating the three-year-picture of the new library to a renewal plan with well defined objectives and outcomes to be reached within three years, the general trend is to go directly for a task orientation. The intangibles or social dimension, which is of the utmost importance is most often neglected. A model for renewal must address

- a **strategic intention** indicating the meaning and the strategic pillars of support required to achieve or realise the meaning of the new library;
- a **social dimension** dealing with its culture and leadership and
- a **task dimension** addressing points of departure for structuring the library and, finally, the action strategic renewal plan to transform the library (figure 5). Dealing with the strategic intention and social dimension first, sharpens the focus on intangibles and makes sure that structure will indeed follow strategy.

THE BALANCED SCORECARD

The librarian will always be confronted by the question: What should be the lay-out of the document and how can the information be systematised in the best way? The balanced scorecard for translating strategy into action [3] presents a very useful tool in this regard. By focussing on sound business management, customer service, the internal work process and on learning and growth, a well balanced approach in translating vision and strategy into action is ensured (figure 6). It is like the dials and indicators on the instrument panel of an aeroplane cockpit. It gives the manager well balanced complex information at a glance. For the complex task of managing change, the manager, like the pilot, needs detailed information on many aspects of the renewal action. The pilot needs information on fuel, air speed, attitude, etc. and relying on the indicator for speed only, can be fatal. Similarly, the librarian must with regard to his renewal plan, be able to view performance in several strategic areas simultaneously. The scorecard prevents information overload and forces the librarian to focus on issues that are the most critical.

Using the balanced scorecard for managing a renewal plan for the library, results in four strategic indicators.

A business or financial perspective

The question to be addressed, is: How does the library look to its shareholders, e.g. to the management of the parent organisation. In terms of managing costs, the affordability of services, products and service levels must be quantified, cleared and contracted.

The way in which information sources are financed, must be accounted for. Does the library have a strategic, well-founded and justified spending plan and formula which will ensure the allocation of available funds transparent and by participation? A plan to guide and accelerate transition from paper based to electronic information, must be implemented.

The business perspective also includes managing:

- other resources like space, information technology and others
- risk to protect both physical or material assets and the intellectual capital of the library (the last-mentioned will prevent losses in leadership and professional expertise)
- partnerships and
- mechanisms like a management information system and a business unit to generate additional funds.

A client and customer perspective

The question to be answered is: How do customers and clients see the library?

The library must have a corporate mission which focuses on its users, having other options to acquire information as well. The library must strive to be number one in adding and delivering value to them. How the library is performing from the user's point of view, has become a priority for library or information services management. Unfortunately, many libraries fail to view performance through their clients' or customers' eyes!

In terms of the balanced scorecard the renewal plan must address the challenge of differentiated services which, for primary clients, may vary from paper or electronic packaging of information for undergraduates and personalised services for clients with more advanced information needs, to selling special services to other clients. The library has the responsibility to make sure that users have the computer and information literacy needed for optimum use of its services.

As the virtual library uses the web as primary mechanism for the delivery of services, the web must be in place to integrate and accommodate different services. The service orientation of the new library as network, requires librarians to join teams of clients (figure 7), to make sure that processes and services are fully integrated with academic program.

Internal business or work processes

Although the focus on the customer/client as such is important, the question remains what the library must do internally to meet the expectations of its users. Satisfactory customer/client performance derives from processes, actions and decisions e.g. the critical internal operations which will enable the library to satisfy customer needs. Processes having the greatest impact on user satisfaction must be identified and the library must address factors like cycle and delivery time, quality, employee skills, productivity, critical technologies, core competencies etc. It implies the development of measures relevant to employees' actions.

A renewal plan must make sure that:

- the library will rationalise, streamline and computerise key-work-processes to ensure an uninterrupted one-stop service
- possible bottle-necks in local, national and international networking have been sorted out
- generic interfaces between services and products exist to make integrated use possible etc.

Learning and growth

Unlike the past, the targets for the library's success now keep changing. Its ability to innovate, improve and learn, is a prerequisite for strategic renewal. As mentioned earlier, the development of new relevant competencies and skills is necessary for outcomes or output required in terms of the renewal plan. Success in this regard is influenced by organisational culture, leadership, alignment, commitment, values and other intangibles. In terms of the balanced scorecard the question must be answered how the library will, in order to achieve its vision, sustain its ability to change and improve.

The renewal plan must therefore develop a human resources strategy which includes a human resources development plan, an outcome and competency based compensation system, a programme to promote a preferred future approach as well as the leadership and structure which will support the library strategically.

The implementation of the renewal plan requires a rationalization and modification of current key work processes. The outcomes of these processes determine new competencies and skills, which will be developed if members of staff are compensated accordingly. However, very few libraries are at this point in time managing an outcomes competency based compensation system. In view of the team based approach, the system must make provision for a team reward as well.

The Academic Information Service of the University of Pretoria will finalize its competency based compensation system before the end of 1999. It is the only library in South Africa, and most probably one of few in the world, if any. Positive reaction on what has been done, compensates largely for the innovative and complicated project initiated a few years ago. It positions the Academic Information Services favourably to implement a three year renewal plan (1999-2001) approved by the vice-chancellor and rector.

CONCLUSION

The major key to the new library lies in alignment. What has been dealt with in this paper is in line with guidelines also set by *The Change Management Handbook* [4] "alignment comes at several levels, beginning with the alignment of the company to its market and the continual fine-tuning necessary to stay in step with customer needs and demands. Internally, alignment means ensuring continuous synchronization of four key business gears:

- a strategy that will develop a blueprint that attacks change,
- operations that are flexible and nimble enough to be quickly altered,
- a culture that encourages people to promote and work with change,
- a compensation system that rewards people for buying into change and constantly seeking improvement."

May the IATUL provide a significant forum to all librarians in search for the key!

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THE INNOVATION IN EVERY DAY LIFE OF LIBRARIES

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Innovation and libraries

The information society, which followed on the industrial age, lets the opportunity these days more than before, for the information development and dissemination, in various forms and media in a local, national and international level. Additionally, individuals feel members of an open information system, not fixed by the locality and institutional isolation. Academic libraries gradually open to the public which are individuals who seek and use information in different ways. These signs are encouraging, but there is a need for the revision of codes and practice if optimal library services are to be provided for a mobile population. Additionally, the situation complexes more by the plenty of scholarly publishing, information sources, vendors, technological and organizational systems which guide to a confuse with a cost increase. The problem however is not the rules and procedures themselves, the problem are the combination of them with costs and funding in a time that ç óõãêñÜôçóç ôùí ðñïûðïëïãéóìþí ôùí âéâëéïèçêþí åßíáé åðéôáêôéêÞ áíÜãêç äéåèíþò. ÐáñÜëëçëá ìå facing the challenges of change, which is an essential procedure, at the same time libraries enjoy the simplification of every day routines. Both of them ðïõ ìïéÜæïõí ìéá áíôéöáôéêÞ áëëÜ ðñáãìáôéêÞ êáôÜóôáóç are depended on technological improvements and development. There are two judgements that librarians have to be able to make about an operation such as library: the effectiveness and the efficiency.

- Is the library effective if it achieves the purposes for which it exists? (i.e. user satisfaction).
- Is it efficient if it achieves its objectives with the minimum of resources [1]?

It is generally accepted for these days practice that to enhance effectiveness, achieve excellence, and ensure survival ability, library leaders need, in full collaboration with staff members, develop conscious, explicit processes for organizational change. There is the sense within the field that investment now is demanded in both technological innovation and organizational change to accommodate it. [2]

Continuous planning, which treats planning as an evolving process, incorporates reference to the environment and adaptations based on learning. This contributes to the concept of the learning organization, defined by David A. Garvin, as one that is "skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior tï reflect new knowledge and insights." [3]

The library functions then involve and presume communication and the continuous interaction, which advance and evolve the library progress and performance.

So, the final question is: Can innovative procedures achieve convenience in practice, efficiency and effectiveness in a simultaneous economic reduction?

According to the Green paper on Innovation of European Union [4] Innovation in brief is:

- The renewal and enlargement of the range of products and services and the associated markets.
- The establishment of new methods of production, supply and distribution.
- The introduction of changes in management, work organization, and the working conditions and skills of the workforce.

Innovation in process accomplishes the increase of productivity and the reduction of the cost. Innovation is not necessarily synonymous with high technology, although this is increasingly involved in equipment, materials, software and methods. The above description proved that libraries belong to those professions, which use the innovation more than produce it, as the technological achievements and products are coming from external sources, so they become innovative in the range of process.

The term innovation process emphasizes on the manner in which the innovation is designed and produced at the different stages approaching and analyzing it (creativity, marketing, research and development, design, production and distribution). Innovation requires a diverse rich - information and interactive environment where people with different perspectives, work together toward a common objective, with accurate, up- to - date information and the proper tools. That's the only source of innovation. And that's procedure means communication.

Innovation is not a linear process, but rather a system of interactions, of comings and goings between different functions and different players whose experience, knowledge, know-how are mutually reinforcing and cumulative. The way libraries capture information declares a role of conversion. It is important to notice that the ability of the technology to capture information in one form and to deliver it in a different one. The function of analyzing, interpreting, synthesizing and packaging information on behalf of users will increase in importance [5].

This is why more and more importance is attached in practice to mechanisms for interaction within the organization (collaboration, between the different units and participation of employees in organizational innovation), as well as to the networks linking the organization to its environment (other organizations, support services, centers of expertise, research laboratories, etc).

As indicated above, Libraries and Innovation have common characteristics such as:

- the process,
- the technology transfer,
- the Communication and
- the intra- organizational and inter-organizational interactions.

Innovative process Organization in Libraries
The methodology, which is intended here, is that of Best Practices. Best practices are almost synonymous to Routines in this case, something quite common to libraries. Routines are the steady and normative rules and behavior models of the organizations. Although the changes in librarian's professional life are fast, it is unavoidable to hold some routines, that is to say the technology they use for the routines for a period of time.

Best practices are a significant test bed for the control of the changes and the effectiveness of the system. As the work environment is complex and interactive, it is necessary for the problem solver and the staff to have an overview of the whole system from time to time and to orient the objects, before decide the adaptations or the modifications. Furthermore, Best Practices help users of the system to learn from it and from their reactions. Their observations will identify improvements of the system as well as new skills and practices [6].

The objective of this method is to examine an organization's performance in a set of activities in order to accept it and as a result, to adopt better practices in processes and improve its competitive position. It is not certain that after examination the organization will accept the outlet practices and procedures. But mainly and above all, the method can provoke the use of other innovative techniques.

The method is proper for library practices because there are plenty of processes for every task and there is always space for improvement. A general issue that applies increasingly in the organization of library services, is that of self- service. Users prefer to serve themselves and the challenge to librarians is to design cataloguing and shelf systems that can help users to help themselves [7]. Surveys of shelf service users in the usa (1996) have provided the following results:

- average usage 30% of total circulation,
- ranges as high as 95% usage,
- less staff needed at circulation desk,
- reduction in cases of repetitive strain injury,
- privacy on research,
- image of the library
- additional time spent one on one students [8].

The steps of the methodology are the following:

1. Staff selection that will participate and training to the method. It is very important for those who are going to implement this method to know it and realize its results.
2. Specification of the areas that will be subject of the technique. It concerns to general objects and specific areas too, the collection building, the cataloguing and classification procedure, the circulation and interlibrary loan procedure and the selection of suppliers, the reference department and information dissemination.
3. Internal data collection to be examined. This is the most important session of the method.
4. Selection of the tool. In this case the selected tool is the value analysis which aims at determining the ways to obtain the maximum value from a service without cost increasing.
5. Brake into basic pieces.
6. Combination with the global functions which it implements.
7. Determination if it adds value and how the cost could be reduced without reduction of its functionality.
8. Analysis of examination results and the final report.
9. Definition of actions and strategy development.

This methodology evaluates the values of a process, that is to say the aesthetics, the function, the use. By undertaking value analysis, a service is re-evaluated and the processes are understood more clearly. The result of the procedure is quite often the innovation of functions and services because a new service that covers the same needs as before is created, and new defined functions will be fulfilled by new services.

While internal Best Practices may lead to improvements as a result of studying excellent performance within a functional area, organizations should look outside from their walls for Best practices to improve performance. That's the point benchmarking begins from.

When computers rushed in libraries every day life, staff catalogued documents once, avoiding the multiple entries of catalogue cards. As the procedure and the technologies went on librarians in an effort to simplify their work using copy cataloguing avoid the cataloguing process itself buying records from the National Bibliographies. Now the copy cataloguing process is transferred åí ðïëëïßò from the cataloguing unit to acquisitions Further more consortia foundation facilitated even more the copy cataloguing and mainly extended the collections of participant libraries because of common holdings and interlibrary loan. In this way, aiming by the technology library earns working force by reducing the work cost, changes collection development policy and improves its services to users establishing new ones.

The Best Practices method is a continuous procedure for the organization, which implements them. The first benefit they could obtain from it is the improvements of closed functions and behaviors, which are new best practices. It is true that the next steps of benefits, such as:

- the definition of the periodic variability of cost in relative to routine and learning as well as
- the modification of function characteristics, the production of innovation

is a matter of the procedure of learning and the educational and training status of staff. Routine tasks actually demand little learning or creativity and expertise.

Innovators are characterized those who offer:

- new variant values and virtues, or/ and
- new variant satisfaction,

to users.

Staff must learn to non-routine tasks that demand specialization, creativity, and fantasy. For achieving this, the library management must have a learning orientation, by creating an environment where every member is continuously learning more about the services, the processes, the users, the technologies, the environment.

In sculpting the Learning Organization, Watkins and Marsick say that it has six action imperatives:

- to create continuous learning opportunities;
- to promote inquiry and dialogue;
- to encourage collaboration and team-learning;
- to establish systems to capture and share learning;
- to empower people toward a collective vision; and
- To connect the organization to its environment [9].

Learning and innovation in an academic library may fuel each other. Learning may lead to innovation, leading to more learning about and with that innovation and more innovation [10].

A staff development program that is designed to enhance generative learning might very well focus on the five core learning disciplines highlighted by Senge. Senge (1994) provides us with brief definitions of learning disciplines:

1. *System thinking* – a way of thinking about, and a language for describing and understanding, the forces and interrelationships that shape the behavior of systems;
2. *Personal mastery* – learning to expand our personal capacity to create the results we most desire, and creating an organizational environment that encourages all its members to develop themselves toward the goals and purposes they choose;
3. *Mental models* – reflecting on, continually clarifying, and improving our internal pictures of the world, and seeing how they shape our decisions and actions;
4. *Shared visions* – building a sense of commitment in a group, by developing shred images of the future we seek to create and the principles and guiding practices by which we hope to get there;

5. *Team learning* – transforming conversational and collective thinking skills, so those groups of people can reliably develop intelligence and ability greater than the sum of individual members' talents.

Conclusions

Innovation is above all a social phenomenon. Through it, individuals and societies express their creativity, needs and desires. Its purpose, its effects or its methods thus intimately involve innovation contained in the social conditions in which they produce.

Innovation is not a strictly predefined model. In the final analysis, the history, culture, education, political and institutional organization and the economic structure of each society determine that society's capacity to generate and accept novelty. Innovator requires innovative thinking that is a skill needed by every member of the organization. It is the ability to constantly look for new possibilities, generate ideas, think together productively, make sound decisions and gain the commitment needed for rapid and effective implementation.

We in the academic library profession are living in exciting times. It is not just the speed of change which provides the excitement, but the recognition that we can make a significant contribution to the progress of the academic community. We must continue to develop our organizational, interpersonal and Information Technology based skills and apply them to the people/ information interface [11]. We need to embrace innovation, to learn how to learn, as the organizations we work for have to learn how to change.

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THE LIBRARY OF THE UNIVERSITY OF SOUTH AFRICA'S MARKETING VOYAGE OF DISCOVERY THROUGH CONVENTIONAL MARKETING CHANNELS AND THE INTERNET

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Introduction

Without the powerful infiltration of the Internet in the information supply domain of libraries, we as librarians might still be in a comfort zone, monopolizing this field. The Internet and its vast distribution capabilities was a wake-up call.

The Web could revolutionise customer relations. The various ways in which companies communicate with prospective and existing customers will be transformed. It moves the focus of customer relations away from the cost of communication toward the quality of the message. E-mail effectively removes the cost factor from the decision-making process, by offering an alternative to the relatively high expense of postal and telephone communication.

With cost issues minimised, new questions arise, What interesting messages can product marketers create? Can they hold the attention of the consumer? Online communications need to be engaging and desirable to the consumer, whether sending a monthly newsletter, an updated product offering or a personalised message.

With the world wide trend of: financial constraints; downsizing; loss of customers; globalization of information; changing educational needs; the evolving discriminatingly aware customer; changing student demands and the need for a hybrid library, the library and information science fraternity came to the realisation that some new approach had to be investigated.

The University of South Africa, also known as Unisa, is the largest University in South Africa and one of the largest distance education institutions in the world. It is located in Pretoria and is a landmark of the capital city. To facilitate its services to approximately 130 000 registered students all over the world, the Unisa Library stocks more than 1,6 million books and other items at the main campus, provincial centres and learning centres in most major centres of South Africa. Unisa offers internationally recognised certificate, diploma and degree courses up to doctoral level in six faculties: Arts, Economics and Management Sciences, Law, Science, Education and Theology and Religious Studies.

The Unisa library using top-flight consultants started a re-engineering exercise in mid-1998, since it was realized that new avenues would have to be investigated to ensure survival in the 21st century. Key products were identified by means of **Strategic Enterprise Modelling**, which included conventional library services as well as new products. These products were tested for acceptancy, viability and feasibility. Critical success factors for implementation of these products were also identified which included many elements of which marketing was the driving aspect.

In the enterprise modelling exercise, a comparative evaluation of envisaged services was done which revealed that web-based services outranked other implementation feasibility scores by 18.80 %. This indicates the future trend of service development that the Unisa Library will, as needs be, strategically follow. Projects are therefore currently being launched by the Unisa Library to develop and implement these products.

The Strategic Enterprise Modelling exercise also clearly indicated that the Library will have to adopt a commercial attitude. Marketing will open up the developing customer centred character of the organisation. It will link this service organisation with the customer and connect with his/her prospective lifestyles and dreams. This is a new skill which the librarian of the 21st Century will have to acquire and use as a tool to gain the competitive advantage in this era of globalization of information. Although information has become globalized, human nature thrives on personal attention and demassification.

Marketing should bring about a paradigm shift in any organisation that has not been strategically customer focused and market driven This is an innovation at the Unisa Library that has the potential for substantive impact on customer satisfaction and connectivity as well as commercialisation of services. I would like to share with you the experiences which we encountered on our **marketing voyage of discovery**. I refer to this as a voyage of discovery, since any voyage of discovery means entering the unknown, riding rough seas, weathering storms, exploring and conquering obstacles. This is a new field and challenge to us.

Marketing of the tertiary library

The discipline of marketing is confronting a dual challenge as Murray (1) comments: **(i)** it must deepen its own competence in functional terms. Technology, different customer requirements and new media all dictate the need for new evolving expertise; **(ii)** marketing activities should integrate better with other departments and functions in an enterprise. This is important particularly concerning strategy, new product and service development and in the achievement of long-term customer satisfaction through dedicated order generation, fulfillment and service activities. Everyone in the organisation should be market orientated.

A new approach has developed and the realization has arisen in marketing, namely, that the central marketing task was not selling the product but rather understanding the market demand to make informed choices as to what should be produced. Customers' needs are therefore the guiding strategy in coordinating organisational activities to serve these needs profitably. Murray (2) feels that the market force has become a key concept in the 1990's, that it "involves the continuing and persistent alignment of a firms resources and unique competencies to changing needs and opportunities in the marketplace in order to create profitable and often durable relationships."

We have entered the technological and information era, with the Internet as champion and remote access as the flavour of the day. Tertiary libraries seriously have to consider a strong migration from the traditional walk-in facility, namely a building with branches at satellite campuses and postal delivery of items, to electronic format and remote access and transfer. Migration must be emphasized, but not until tertiary libraries are convinced that: an electronic tuition model is totally acceptable to all students of tertiary education institutions; all customers have access to a computer; all customers are computer literate, and that walk-in customers are so dramatically diminished that they are not a viable market (3).

This migration will also, as required be gradual, until more academic information becomes available on the Internet and the tuition model migrates to electronic format. The competition is not that great at present but tertiary libraries must be aware of the impetus and the avalanche which may be approaching in the form of electronic delivery (4).

Tertiary libraries will have to become market focussed, develop their core competencies, get to know their competitors strengths and weaknesses and then only enter the competitive arena. In my opinion service organisations are organisations that provide appropriate services, whether on an individual or on a collective basis, to customers, be they individuals, companies, a community or country, to satisfy these customers specific wants and needs. The service can be face-to- face or faceless via technology as the quality is experienced at the time of consumption. The customer should also be prepared to reciprocate with a counter exchange, be it in the form of a service, payment, acknowledgement or sign of loyalty. The success of the service provided will ultimately depend on its relevancy, the interaction between the service provider and the receiver, and the customer's perception of the efficacy of the service (5).

To quote Irons (6) "the need to bring the customer into the mainstream of consciousness in an enterprise and to have an understanding of the customer's real needs - surely is the very essence of marketing". The world around us has become more focussed on service issues and on realizing the value, from the usage of the purchase, rather than from the organisation and its market, with the core product as a focus. However between people their interaction becomes the focus.

The trend to service, from the customers point of view, is a movement away from possession of products as a dominant motivation, to utility. The shift in an organisation or business, is towards experience and utility when supplying or selling a product and away from mere core products. Furthermore, trying to lock up knowledge stifles the life-giving flow of information that allows a system to self-organize and renew itself. Today, the new knowledge equation is knowledge = power - so share it and it will multiply.

The development of technology throughout history has been the greatest catalyst in paradigmatic changes in the global economy. Technology has influenced the way business is conducted, communication systems develop, competition, marketing and knowledge flow changes and therefore how organisations grow and survive.

The service marketing triangle

The library as a service organisation can greatly benefit from Irons' (7) idea that a service marketing triangle exists. He bases this on the KIA Management Consultants service marketing triangle to represent the marketing of services. The organisation and the staff are represented on the left axis and the market and the organisation on the right axis, the traditional marketing mix, of product, price, place and promotion, only operates on the right axis, between the organisation and the market. Using the service marketing triangle it becomes evident that marketing of a service is a much broader task. It is about choosing customers and creating products, according to the customer's needs. It is also about the interaction that takes place when these are brought together.

Zeithaml & Bitner (8) refer to three aspects of marketing on these three axes that would be encompassed in the service mix (which is an adaptation of the traditional marketing mix to accommodate an essential fifth part of the mix, the interaction). Together with "external marketing" efforts on the right axis from the organization to the customer, there should also be "interactive marketing" from the staff of the organisation to the customer on the horizontal axis, as well as with "internal marketing" on the left access from organisation to staff.

External marketing sets the promise of the service. This is anything that the organisation engages in to communicate to the customer before service delivery, what their expectations can be concerning the service promise. Internal marketing's critical role is enabling the staff to keep the promise that has been made to customers. The activities concerning internal marketing, are those that the organisation must carry out to train, motivate and reward its employees. Interactive marketing actually delivers the promise and is based on the assumption that staff satisfaction and customers satisfaction are inextricably linked.

The nature of service marketing is intrinsic in defining the interaction, as the production/consumption process evolves when the customer selects the service face-to-face with the organisation's staff. The staff factor predominates in the interaction and results in the satisfaction or dissatisfaction of the customer with the service or the solution to his/her problem. These perceptions usually offer the organisation the opportunity to create a competitive advantage. It is the interaction, according to Irons (9), which is viewed as the principal product, by the customer because it is this which is the main deciding factor in relating solutions to problems; it is here that value is created for the customer. It is in this interaction that a "bridge", as an analogy, is constructed between the organisation and the customer. This bridge must be crossed mainly at the point of interaction not by the customer to the organisation, but by the organisation to the customer. This becomes the organisation's opportunity.

One would like to add an encompassing circle to this triangle, representing the mission and vision of the organisation, which encapsulates and drives all the activities taking place within the organisation.

The marketing plan established for the Unisa Library
A marketing plan has been set-up as a directive of the marketing project implementation. A specific time frame has to be adhered to for implementation. This plan will be directed by the overall mission and vision of the library. Matters which have been scrutinized and documented are the setting of objectives, internal and external environmental analysis. A competitor analysis has still to be investigated in depth. Questionnaires have been compiled and the results of these will give more directive to the product and pricing strategy. Thereafter the communication strategy will be developed and implemented.

Target markets which have been identified
Current target market segments were identified during the Strategic Enterprise Modelling exercise. Questionnaires were compiled and are presently being sent out to three broad market segments.

- Registered students and ex-students

  Included in this category are: Unisa learners (students up to and including honnors level; Unisa Masters and Doctoral students, students from other tertiary institutions; prospective Masters and Doctoral students; certificate course students; unserviced Unisa certificate students and bridging course students.

- Unisa staff

  Included here are Unisa academic staff; Unisa professional staff; Unisa administrative staff; indirectly paying members of staff which include Unisa supervisors, tutors, temporary staff, contract workers, outside markers and retired Unisa staff and Unisa alumni.

- Commercial clients

  Academics from other tertiary institutions; other libraries; directly paying members; GAELIC Consortium members; donors and benefactors; foreign ambassadors & their spouses; the Internet community; the business sector; government; private sector tertiary institutions; schools; students from other tertiary institutions and ex Masters and Doctoral students.

Marketing of the emerging Unisa hybrid library
The need to continue with a hybrid library is essential in an emerging market scenario typical of the South African society. Our traditional customers and most especially the category Unisa learners must not be neglected in the new marketing paradigm. Marketing should enable the library to serve the needs of this emerging market optimally, since the needs of this very important target group can be monitored better once a dialogue has been created with them.

The Unisa library is also committed to focusing simultaneously on the commercialization approach, which could offer the library the competitive edge as well as survival into the 21st Century in current economic conditions. To the present this has not been focused on at the Unisa library, although research has been conducted into implementing a fee-based service. There is a great demand for these personalized services especially in the business and legal sectors of South Africa. By virtue of the size and wide subject content of the collection of the Unisa Library many businesses could benefit from the services of the Library. One of the factors that requires attention to implement this, is the fact that a mechanism will have to be developed to receive revenue from customers. A policy also has to be developed to channelize this revenue into the existing funding received from the University.

A marketing project implementation team has been assigned, representing every product area, in order to get a broader staff component on board in the emerging marketing paradigm. It must be understood that at present we have no expert marketing staff, but staff who are prepared to accept the challenge of this new field.

The Communication strategy

It must be emphasized that the concept "marketing" is often wrongly equated with merely the advertising of products. Advertising of the products which an organisation has to offer, is a part of the marketing plan and can be referred to as the communication strategy, which is a component of the overall marketing plan.

In especially the hybrid library situation conventional marketing distribution channels will be used to reach the section of the library's customers, especially the less affluent, to communicate to them what services the library has to offer. Simultaneously webmarketing will be developed to remain relevant and competitive and reach the online customer. The marketing of information is a competitive area since these markets are dynamic and ever changing. Marketing on the World Wide Web is the future of especially libraries servicing distance teaching academic institutions, to reach global markets for existing as well as potential customers.

Conventional communication channels

Conventional avenues will still be used. These include certain publications of the University. The Unisa News is sent out to all registered students and staff, therefore this can be used to advertise library services and products. The Unisa Bulletin targets all Unisa staff members. We have also extensively used posters and fliers to reach our students and staff on-campus. Electronic e-mail messages can also be posted via e-mail to our lecturers. All these will still be utilized in tandem with Webmarketing. Publishing product information in the mass media is costly and this would only be considered in rare cases.

Even though the trend will move toward greater Webmarketing, it must be rembered that the conventional media can also be used effectively to advertise the library's Website. It is essential to ensure that all the staff know the address of the Website. The library's Uniform Resource Locator (URL) and e-mail address must appear on all letterheads and business cards. The URL should also be included in the telephone answering service, so that the library is accessible for correspondence 24 hours a day. Leaflets could be swopped with other libraries on which the Website is clearly visible. All media used should prominently feature the library's URL. Pilkington (10)

Our walk-in students also have access to a limited number of terminals which they can use to access our Website.

Web-marketing

The most important feature of web-marketing is attracting traffic to your site. Homepage design can be a commanding marketing tool when created effectively. Those companies according to Wolff (11) that are making a spirited attempt to get Net users to stay at their site are aggressively taking advantage of the different and unique advertising opportunities of the online world. The Net delivers an audience already familiar with the medium and offers an incredible number of potential advertising spaces: online magazines, Internet directories, services, other company sites, general interest sites etc. Some of these spaces cater for niche markets and specific demographic groups, while others deliver to a large variety of people. The Net also promises to provide completely new ways of attracting consumers to Websites through the technological and particularly interactive potential of the medium.

In the 19 February 1999 (12) issue of Finance Week, an accredited South African financial journal, it was reported that the Internet Advertising Bureau (IAB) Ad Revenue Report, released in February 1999, compiles data directly from Internet publishers, making it one of the industry's most timely and accurate gauges of online advertising revenue. Commenting on the report, IAB chairman Rich LeFurgy says:

> *"This report is the biggest endorsement yet from the marketing and advertising communities that online advertising is here to stay as an integral component of their marketing and branding plans. The industry continues to grow, and shows strength as it does".*

It must be made clear that the Unisa library has implemented some of the aspects being mentioned and might consider implementing others after carefully assessing their benefits.

Webmarketing tools
Effective tools exist which can be used for Webmarketing

- **Gateway advertising**

  Companies, in addition to advertising offline, can advertise online, drawing traffic to their Websites by placing advertisements on other sites.

  A number of high-traffic areas on the Web, especially media sites like Time Warner's Pathfinder (http://pathfinder.com), and directories like Yahoo (http://www.yahoo.com), have begun to actively solicit advertisements. For the most part these advertisements have taken a single form, namely the "gateway advertisement", also known as a link ad. This gateway is typically a graphic displayed on the editorial or directory site. If the customer chooses, he/she can click on the graphic, from which they are then transported to the advertiser's home page. This form of non-intrusive advertising has proven to be an effective means of building Website traffic. As the Web becomes more populated, this form of advertising will become even more essential.

  High-traffic sites sell other companies space on their Web pages for displaying these gateway advertisements. These take the form of banners, logos or icons. At present banner ads remain the most popular. The favoured size is approximately 2.50 cm strip, as wide as the Netscape or Internet Explorer screen, known as banner ads. When customers visit these high-traffic sites and are intrigued by these gateway banners they can choose to ignore them, or click on them and are then transported to that Webpage, in the form of a non-intrusive invitation to learn more about the company or institution who has placed this banner advertisement. Our sponsors can also be encouraged to place banner ads on our Website and in this way provide additional awareness of the library's services and stature in its community.

  In the February IAB (13) report it is also pointed out that banner advertisements are still reported as the most predominant type of advertising, accounting for 53% of total online adverts. It therefore becomes imperative that the Unisa Library research the viability of these advertisements on its Website.

At present a workgroup is establishing a policy concerning gateway advertising not only for the Unisa Library, but the University as a whole.

Gateway advertisements, however, are certainly not the only way to use the Net to advertise a Website.

- **Product information and recommendation**

On the Unisa Library's Website (http://www.unisa.ac.za/library/index.html) all future training sessions dates and venues are posted monthly, by our Webmaster Mrs Sandra Hartzer (hatrzs@alpha.unisa.ac.za) advertising all the training offered by the library to students and all Unisa staff as well as community training. This training involves inter alia basic and advanced Internet training, basic and advanced library skills and the use of subject specific databases. All locally created databases are also advertised. Another major development at the Unisa Library is the creation of an electronic reserves facility, implemented by Mrs Ansie Watkins (watkiapj@alpha.unisa.ac.za). Our Webpage gives access to all developments concerning this at the Unisa Library as well as links locally and worldwide to this facility.

Other product information available at the library is also advertised, such as access to electronic journals and locally created databases, such as a music collection database and a slide collection database. This highlights the fact that a Website should not be used to advertise the library or institution, per se, but the products that the library has to offer it's online customer.

- **Establishing customer discussion panels and creating a dialogue.**

It is essential, if a library becomes market driven, to establish a dialogue with its customer to ascertain the satisfaction levels of its customers as well as their future needs. Discussions are underway to establish listservs for the library to encourage dialogue. A feature on our online catalogue for posting suggestions already is operational. This has proven to be well used. Although it was established to acquire suggestions for the future development of the catalogue, it is used by our customers to make suggestions on all library matters, as well as general University matters. This indicates the hunger customers have to make a contribution.

Accessible via our Library Homepage is our Students Online (SOL) feature which enables the student to access his/her student information, assignment marks and credits, exam timetables and other relevant information. Assignments can be posted online and students are able to communicate with a selection of lecturers electronically. Access to this is by password only, therefore all information is confidential.

Also available on the Internet are Websites such as Delphi (http://www.delphi.com) which undertake to establish online chat sessions at given periods of choice in order to have live discussions with other interested parties, remotely as well as on-campus customers. This could be a valuable avenue to establish customer needs.

- **Targeting specific demographic groups**

As explained above certain groups of customers have been identified as specific target groups. Questionnaires will be sent to these groups by surface mail or conducted telephonically at first. Eventually online questionnaires and surveys via electronic mailing lists or listservs might be distributed, once these have been created and databases of customers and their details and areas of interest have been compiled. Banner ads for specific target groups can also be placed on Websites with preferably similar target groups. As an example, one library could purchase advertising space on another similar library's Website and vice versa. This could work well in the GAELIC Consortium environment that the Unisa Library has entered into. Here no revenue needs to be exchanged, but goodwill, in the form of one library advertising special aspects of information supply of another library, e.g a good collection of online information concerning legal or business and economic information.

- **Evaluating gateway success**

The question then arises as to whether the gateway advertisement which your library has bought space for, on a specific Website, was a good choice and is attracting traffic to your site. By installing a counter on your own Website the Webmaster can identify the number of visits to your site, for example the Unisa Library was able to determine that our site was visited 59,000 times from June 1997 to March 1999. Other statistics can also be kept by installing the counter to provide other types of statistics, namely whether the visits were on- or off-campus, as well as if certain divisions in the library's Web pages were visited more than other's. The Unisa Library has also, via a counter, been able to observe that the text version of the Webpage is not being used frequently enough to warrant retaining it.

- **Pricing**

Pricing is an important part of the product value offer, but remains the most difficult aspect for our library, as more research will have to be done concerning competitive rates. Independent revenue generation for the library of the 21st Century is essential for it to remain relevant and competitive. This is an ongoing and ever changing aspect of marketing, as certain products become superfluous and new products are demanded.

- **Getting listed in directories**

The online world is vast and can be difficult to navigate. There are three ways in which this can be approached, depending on constraints of budget and staff time, since getting listed can be tedious and time consuming. Free software is available on the Internet by means of which the library Webmaster or an assigned member of staff can do this independently. Yahoo (http://www.yahoo.com), is one of the quickest and most reliable maps of the Internet as well as online search engines, such as Webcrawler (http://www.webcrawler.com), and Altavista (http://www.altavista.digital.com) each with its own strengths and weaknesses. Another alternative is using Websites that provide the service for, you at a cost. These sites automate the submission of site descriptions to a specific group of directories, for example, Ryan Scott's Postmaster and WPRC Website Promotion Services. It is essential to index information on your Website effectively with searchable metadata elements.

- **Joining industry hubsites**

Libraries can also join industry hubsites which are subject related. Industry hubsites bring together related businesses for the convenience of the consumer. Some industry hubs offer to create and maintain home pages for their members. The synergy of sharing the same space with other similar libraries could be valuable. Some are free of charge, while others involve costs.

- **E-commerce**

The Unisa Library's media ordering and acquisition department is investigating developments in the field of e-commerce. At present the University is investigating the introduction of a SmartCard system for students. Research has proved worldwide that these cards are more secure than credit cards.

Years of contact with book publishers and vendors brought the entrepreneurial ideas of our acquisitions librarian, Mrs Jean Maree (mareeja@alpha.unisa.ac.za) to the fore. She has developed a South African publishing industry database, which could possibly be used as a trading network which could be made available electronically. This has the potential to generate revenue from publishers and vendors who buy advertising space on this database for various advertising packages. When searching on the Internet one often finds a banner ad popping up for amazon.com with the message "Buy books on ..." on the topic you are searching. This offers intrusive advertising for the institution. Similarly the library can use this to generate revenue and bolster its e-commerce drive.

- **Internal marketing**

  When a paradigm shift occurs within a library, where it becomes customer driven, the staff of the library must be included. The need to establish an Intranet became evident, both to distribute all library documentation and involve staff. All matters relevant to the library staff are posted on the Intranet and staff are encouraged to use this tool to keep abreast of changes and trends. Fliers with information about the Intranet and its URL have been distributed to the library staff at Unisa.

Conclusion

This has been a brief look into the marketing voyage of discovery of the Unisa Library. Land has only just been sited and careful steps have to be taken while we enter this unknown yet panoramic future. If one considers the advances in computer engineering with so many computers being sold as multimedia systems, the time is ripe for marketers to add a plethora of new enhancements to their marketing plans. Personal notification will be in demand via e-mail, pagers and fax. Online marketing is new and constantly changing. As new tools evolve let us use these as new strategies to win over, retain and create a dialogue between the customer and the library. In the competitive information age, markets just simply do not stand still. Every development on the Internet will have to be embraced by the marketer and the librarian. We as librarians remain in the information business but a paradigm shift from the custodian, to the bridge builders, between our customers, our organization and ourselves will become the driving force. Let us, join hands, make alliances and enjoy the great new customer world, even though the 21st Century librarian may arrive, using a brand new hat.

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List of Acronyms

GAELIC - Gauteng and Environs Library Consortium

IAB - Internet Advertising Bureau

SOL - Students Online

URL - Uniform Resource Locator

Biographical details: Kathy Kunneke
I joined the Unisa Library in 1976 and have worked in both the Acquisitions and Cataloguing Departments. Our cataloguing activities are conducted in various self-managed teams each servicing certain faculties. At present I am the coordinator of the Economics, Management and Law Faculty Team which consists of five staff members. I was involved in the development of products in the Strategic Enterprise Modeling exercise and consequently with the marketing plans being implemented at the Unisa Library. At present I am completing my Masters degree in Information Science at Unisa entitled: The paradigmatic shift of service organisations in South Africa: a marketing model for university libraries.

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IEEE and Libraries: Joining Forces to Serve a Growing Community

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As the world's largest professional technical society, the IEEE's vision is to advance the global prosperity by fostering technological innovation, enabling members' careers and promoting community worldwide. The IEEE promotes the engineering process of creating, developing, integrating, sharing and applying knowledge about electro- and information technologies and sciences for the benefit of humanity and the profession.

Besides being a very large, not-for-profit membership organization, the IEEE is a highly respected technical publisher. The IEEE's dual roles require the organization to balance the needs of its membership with those of its customer base. As we move towards more electronically available content, the balancing act becomes critical to the success of our programs. The Institute is committed to working with the membership and customer communities in order to fulfill its vision

A Description of the Institute

The IEEE is made up of 37 technical Societies and Councils. These groups are arranged based on technical interest, but many - such as the IEEE Computer Society - span across disciplines. One unique feature of the IEEE is that these Societies have a great deal of autonomy. That means, the individual Societies may develop membership programs and products based on their specific needs and goals, always keeping the IEEE's overall vision in mind. The IEEE brand name is very important to the Institute and appears on all Society products - from publications to websites.

Since IEEE is a global organization, we must be sensitive to customs and languages around the world. With offices in Brussels and Singapore as well as the US, the IEEE maintains a global presence to manage its members' and customers' needs.

An Overview of the IEEE Membership

Each year the IEEE conducts a survey to better understand the membership and determine new issues of concern. For example, currently, 50% of membership is under 40 years of age. This reflects a trend of younger, more computer literate engineers joining the Institute as part of their professional growth. Sixty-four percent of IEEE members have a graduate or Ph.D. degree, highlighting the need for the IEEE to continually adjust its products and services in order to better serve its membership.

The study asks members to name the reasons why they join the IEEE. In the 1997 survey (the latest available), 78% said they joined the IEEE because they want access to the latest technical developments (showing the importance of attending technical conferences); 62% want access to IEEE publications (showing the value members put on IEEE publications); 49% want to enhance their technical skills (showing that continuing education requires research - most likely with a librarian's or information specialist's help); and 60% want to access publications online (proving that electronic access to key content is a vital part of a member's development).

IEEE's membership continues to grow. In 1998, the IEEE ended with nearly 335,000 members worldwide, a record growth of almost five percent over the prior year. Student membership is growing too - up nine percent from 1997 to 1998 with the most dramatic increases coming from outside the US. Student interest in computer-related careers with high earnings potential is stimulating growth in enrollments in technical fields that fall under the IEEE umbrella. In the US, undergraduate computer engineering enrollments grew 50 percent from 1993 to 1996, partially offsetting the ten-year decline in undergraduate electrical engineering majors. Graduate enrollments during the same period remained stable. The IEEE has about 1,000 Student Branches at technical universities worldwide. Directed by an IEEE Counselor who is an IEEE member, the Student Branches work to introduce engineering students to the IEEE, its publications and careers in the fields.

But not all IEEE members are in academia. In fact, only 14 percent of IEEE members work at a university or other educational institution. Over 50 percent work in industry.

As membership continues to grow, the demand on libraries to offer IEEE publications will also grow. Many of the libraries served by IATUL librarians are used by IEEE members. Together, IEEE and academic libraries share the goal of fostering the careers of young engineers. IEEE publishes and disseminates professional and technical information. Libraries provide access to student end-users.

Reviewing IEEE's Publishing Program

IEEE publications are peer-reviewed and are continuously shown to be among the most highly-cited in their respective fields, according to the annual Journal Citation Report produced by the Institute of Scientific Information (ISI). The IEEE publishes 105 technical periodicals and about 350 technical conference proceedings. There are currently nearly 900 active standards as part of IEEE publishing operation. The IEEE offers libraries many ways to access its content - print, microfiche, CD-ROM or online. Packages of content are available for the periodicals - the All-Society Periodicals Package (ASPP) - and for the conference proceedings - through the Prepaid Order Plans (POP).

The IEEE was one of the first publishers to offer its content in electronic form. Originally released in 1992 as a collaboration with UMI, the CD-ROM product, known as the IPO, provided access to the PDF images of IEEE's and IEE's periodical, conference and standards literature back to 1988. In 1995 the IEEE decided to gain better control of product development and customer base by offering the product through our own operation. Since 1996, the IEEE has offered the IEEE/IEE Electronic Library (known as IEL) on CD-ROM. Today, the IEL consists of more than 400 CD-ROMs housing more than 2 million PDF page images of content from over 12,000 publications. That's more than 300 GB of content - quite overwhelming in a CD-ROM environment. In November 1998, the IEEE released the *IEL Online* bringing valuable content to desktops of engineers around the world.

It is important to note that IEEE product development takes user feedback, particularly that from librarians, into account as we refined the IEL. In November 1996, the IEEE conducted its first librarian focus group meeting. This session was influential in moving the IEL from a proprietary user interface to one that utilizes a web browser. We quickly learned that our librarian customers were key in helping us develop user-friendly products. Throughout our current development process, we invite librarians and end-users to provide their feedback so that we can be sure to meet users' needs.

In 2000, the IEEE will release the next generation of online products. All products - the *IEL Online*, the electronic versions of the ASPP and POP products - will be delivered through a new and exciting interface. Not only will the IEEE be able to provide interactive documents with live reference links and full-text html searching for periodicals, content will be available online before the printed version. Ever mindful of our membership's needs, we are currently developing plans that will allow members and non-members access to content based on their relationship with the IEEE. As we develop features and functions of this new program, we are working with librarians and engineers to test ideas and programs.

Partnering with Librarians

Our partnership with librarians is so important to the IEEE, that we instituted our first Library Advisory Council this year. Made up of academic, corporate and government librarians, the Council is meant to further help the IEEE understand their concerns and issues. LAC members are not just limited to the US market. We currently have two European members on the Council. The Library Advisory Council will meet twice a year to discuss issues such as policy statements, industry trends and product development. The IEEE is committed to the Library Advisory Council and will report results of its meetings to the appropriate IEEE volunteer committees.

As a global organization, it is important that the Institute reach beyond the US borders. Speaking at IATUL and other conferences outside the US further enhances our opportunity to meet with our library partners. The human communications is still a vital part of our work today in electronic publishing.

The IEEE has instituted some other programs to help it communicate with librarians. Beyond the Library Advisory Council, the IEEE produces a quarterly print newsletter (Access IEL), a quarterly print catalog of new titles - particularly for conference proceedings (Publications Bulletin) and an electronic newsletter specially designed for librarians (What's New @ IEEE). Through these programs, the IEEE hopes to open communication with the important library market.

As you know, there are many topics of interest in the library and STM publishing communities today. Pricing, access rights to online content, archiving, training are just a few of the many issues that we all face. Through the good work of the IEEE Library Advisory Council, the IEEE hopes to gain a better understanding of the librarian's point of view in order to make real decisions that are mutually beneficial to the libraries as well as the IEEE.

In conclusion, this talk was designed to bring to you an understanding of the IEEE as a membership organization, a technical publisher and a partner to technical librarians. Working with librarians to form strong relationships is especially important to the IEEE. After all, we are both serving a growing community of eager, young engineers who still require guidance in their professional development.

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IATUL

BEYOND RE-ENGINEERING: DEVELOPING SUSTAINABLE SUCCESS

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Many organisations across the world have reported dramatic performance breakthroughs as a result of re-engineering. All too often, however, the results of re-engineering or restructuring are disappointing or short-lived. This is the story of our organisational journey – a journey that began with a re-engineering project. It is a journey marked by extraordinary, and to some degree, unexpected successes, although there were some rocky stretches along the way. The formation of a strategic alliance with a library vendor played a significant role in achieving performance objectives. However, it was the deliberate change of culture and injection of "human spirit" that made the success sustainable.

Griffith University is situated in Brisbane, Queensland. It is a multi-campus institution serving over 19,000 students. Four campuses are located in Brisbane, one at the Gold Coast and another has just completed construction at Logan, south of Brisbane. Technical Services functions are centralized at the Nathan campus. The library clientele consists of undergraduate and graduate students, academic staff and small number of associate borrowers.

The Re-Engineering

> *The optimist says "That the glass is half full..." The pessimist says, "That glass is half empty..." The re-engineer says, " You only need half that glass!"*

Prior to 1995, the Technical Services section operated in a fairly traditional way with separate acquisitions and cataloguing departments. In 1995, a committee comprising the manager, elected staff and an adviser reviewed the operation. After intensive investigation and consultation with all staff, the project team recommended that the section be re-structured into five faculty based teams. Each of the teams was to incorporate the full range of acquisitions and cataloguing functions.

After twelve months, an external consultant reviewed the results of this re-structure. There were obvious improvements. The clerical staff in particular had had become multiskilled and all staff had a greater appreciation of the total acquisition and cataloguing process. Because the teams were subject and faculty based, the section had become much more client focussed. However, it was disappointing to learn that the expected productivity gains were not being realised. We had assumed, as others had before us, that "simply changing strategy or restructuring roles (was) going to do the trick. Everything we try is quickly absorbed by the very cultural patterns and practices we want to change." [1]

Rather than work at incremental improvement, the library decided to embark on a radical re-engineering project with the assistance of an outside consultant. Unlike the first review, this project group was to be very small (4 members only), the timeframe short (eight months from start to final blueprint), and the input from staff fairly limited. The goals of this project were very ambitious – a 50% improvement in productivity. The painful reality was that 50% of the staff currently working in the section would not be re-employed within the unit upon implementation of the plan.

This was a tense and stressful time for all staff, and the project team acknowledged the need for frequent, open and honest communication. At the time, staff were critical that they did not play a greater role in the re-design project. However, the consultant believed it was too difficult for staff to be involved in a project that would design themselves or their colleagues out of a job, and in retrospect, this was clearly the best decision. Re-engineering can be a very threatening experience for both middle managers and their staff alike.

The project team put in a concerted effort to confront outdated assumptions about how to organise, manage and perform work. They conducted literature searches, talked with libraries, library vendors, system vendors and designed the system as if creating it the very first time. Simplicity was the key. Technological solutions were employed wherever possible to eliminate or reduce boring and repetitious work. Some functions were outsourced, but only where it was more efficient or cost effective to do so.

The Partnership

> *"Partnerships of all kinds will be the thrust of the Nineties and beyond"*
>
> Reuben Clark, CEO Colgate Palmolive

A key ingredient in the redesign was the decision to put most of our eggs, that is our acquisitions dollars, into one basket only - and watch that basket very carefully. Our aim was to select a single supplier who could service the majority of our needs and with whom we could develop a long-term partnership arrangement. But how is it that forming a partnership or a strategic alliance can improve an organisation's bottom line? What is a partnership anyway, how does it differ from normal "good" relations with suppliers?

A partnership is intended to foster a close working relationship where both parties invest time and energy to create and maintain best possible practice. It is founded on mutual trust, open and candid communication, cooperation, collaboration and joint problem solving. Both organisations benefit. Both can achieve far greater returns working together than either could achieve independently.

This all sounds good in theory! But, we all know that the main reason for a vendor's existence is to make money. As the early industrialist Adam Smith wrote, "It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard for their own interest." The library's need though, is to acquire resources at least cost. These appear to be conflicting interests and it is difficult at first glance to see how two parties with opposing stances can work together to achieve mutual benefit.

Traditionally, managers have felt that competition between many suppliers leads to not only better security but also ensures better prices. For many organisations, the aim of the "purchasing" department is to make each and every purchase as cheap as possible - hard nosed bargaining, shopping around, playing one supplier off against another. The trouble is that in purchasing, indirect costs are higher than direct costs. While we focus on doing good business deals with vendors, monitoring their prices, services, and turnaround times, we tend to be surprisingly tolerant of our own foibles - our internal costs, our internal turnaround time. Focusing on price alone ignores the costs of processing, or the indirect costs. It is time to take a more holistic view.

Reduced overall costs are not the only benefits. Reducing the number of suppliers gives the organisation better potential for working closely with the remaining ones. The administrative work becomes far more efficient - there is less paper flow, less handling. Negotiation is easier and there is less detailed correspondence.

With a sole or small number of suppliers it is easier to create opportunities for automation of tedious and repetitive work. Only a minimum of interfaces need to be created and maintained. In addition, the monitoring of reliability and quality is easier. Indeed it is preferable to eliminate vast quantities of checking and monitor the quality control procedures of the supplier instead! At Griffith, individual checking of over 30,000 items has been abandoned if favour of checking the quality control procedures of our vendor and regular spot checks.

Time spent inspecting work costs. Time spent correcting errors costs. But a root cause approach to problem solving means that ultimately less time can be spent on inspecting work. Rather than an attitude of blaming or fault finding, time is invested to locate the origin of the error and correct the cause. This type of commitment to problem-solving leads to increased efficiencies for both organisations. With a concentration of effort we can aim for zero defects.

Yet another benefit is the potential that this arrangement provides for close technological collaboration and development. The supplier becomes an extension of the acquisitions department. Both parties need to make it their business to understand the other's business, to share knowledge and education, to propose radical and innovative solutions that in turn help other clients and ultimately the vendor's business. Partnerships create an enabling environment for encouraging innovation and a culture of continuous improvement.

Obviously the selection of a suitable partner/partners is very important. Before we can be sure that we are providing quality service to our clients, we need to be sure that we are dealing with quality suppliers ourselves. The selection of a suitable partner needs to be based on a range of criteria including technical expertise and willingness to be wholeheartedly involved in a partnership. But as there is no perfect marriage partner, there is no perfect supplier AND there is no perfect customer. Both organisations need to be willing to work together, to create synergistic solutions, to adopt a continuous improvement culture.

Newman admitted "Just a decade ago a trend towards single sourcing would have been considered an invitation to disaster." [2] However it appears from published information that partnering has so far been highly successful. Lendrum [3]quotes a study by Schreiner in 1991 in which 18 partnered projects were studied over 3 years. Productivity increases of 16% to 17% or better were reported in all cases. Our experience at Griffith has also been positive. That does not mean that it has always been without misunderstanding, frustration or disappointment at times, but those problems are worked through and resolved in a mutually satisfying way.

Forming healthy partnerships with one or a few key suppliers is one tool that we can use to achieve a significant improvement in costs, quality, cycle times, and technology with little or no added expense. Partnerships, like all healthy relationships, take time and commitment, communication and trust to succeed.

The Culture Change

> *"Whatever else high performance and excellence may be based on, they would seem to have something to do with quality of spirit, human spirit, our Spirit, the Spirit of the organisation."* [4]

So far so good! Yet the statistics show that more than 70% of re-engineering efforts fail. Without a significant shift in culture, the law of entropy prevails. In order to sustain the success that had already been achieved, the culture had to change. Our vision was to create a high performance organisation where excellence was celebrated, an organisation where people were actively and enthusiastically involved, took ownership and responsibility for their own work and were committed to continuous improvement. And not least importantly, we wanted people to enjoy work and gain a sense of satisfaction. We wanted to create a place where people could "shine"!

Once again the statistics are sobering. According to Owen "each year billions of dollars are wasted on ambitious efforts to alter patterns of behaviour. Most start with a bang, quickly begin to splutter, and end with things very much the same as they were." [4] Nevertheless we had read about organisations that had managed to beat the odds and we were determined to join their ranks. It was a matter of drawing on lessons learned from quite diverse organisations worldwide – what worked, what didn't. Our research indicated a few key principles common to successful organisations: trust; communication; participation along with responsibility; opportunities for growth and development; reward and recognition; communication; and strong teamwork. These were to become the foundations of our culture.

The section was organised into two teams – serials and monographs. Team leaders were appointed; although the ultimate goal was that the teams would become self managed. The leaders selected their staff, and existing staff were given the first option to apply. Selecting the right people was of critical importance.

The first few months were a flurry of activity and excitement. Upon reflection, the tasks were urgent, the vision bold and ambitious. We started out with a blueprint that hadn't been tested; a set of guidelines for operating high-performance self managed teams, and a naive but passionate determination that we were going to make this work.

Most authorities on teams suggest that it takes a good five to ten years for teams to become fully developed, so we can only claim to be half way there at present. But already there have been very significant changes from the way traditional teams operate. As with other self managed teams in industry, the TS teams have assumed responsibility for most of the key functional and managerial areas, within a framework of accountability. Team members make all decisions directly relevant to their work. Amongst other things, they accept responsibility for all staff recruitment within the section, for organising and running meetings including 'team health' meetings, internal training and the development of a learning organisation. Traditional hierarchies are minimised.

All staff are required to spend a minimum of thirteen days per year updating and refining their skills. This may take the form of on-the-job training, attending courses, private reading or study during work hours. Although staff can apply to the team to attend outside courses and seminars, staff are encouraged to study and present workshops to their colleagues on topics of relevance to the team.

Performance management features strongly; for instance, a detailed methodology has been designed to calculate the unit cost of services. Unit costs and other critical performance measures are reported and scrutinised at regular intervals. These include the number and impact of innovations suggested and implemented; the development of expertise within the section; even the rate of absenteeism, which is an indicator of the "organisational health" of the team. Individual team members have their performance evaluated twice yearly. In the monograph team, the team members evaluate each other's performance through a system of 360-degree feedback – an initiative proposed by team members.

Team leaders and managers have made it a priority to freely share all information with all staff – only information of a personal, confidential nature is suppressed. Open and honest communication is essential to building trust. Other initiatives of the section include the establishment of cross-team project groups, themselves self-managing. One such group researched and developed a Reward and Recognition Program to reinforce its importance within the culture. Successes are celebrated at both an individual, team and section level. As Weinstein says, "by adding an element of fun and celebration, we take an important step towards humanising the workforce, and creating a sense of heart and soul in the organisation." [5]

The bottom line post re-engineering is impressive - more resources are being processed in half the time, with half the staff, without loss of quality. However, the real success comes in the ability to sustain and improve upon those results. Since the initial re-engineering, the section has been able to contain unit costs despite significant salary increases, to undertake projects to improve the integrity of the database and to develop innovative solutions for delivery of information to clients. This success comes as a direct consequence of hiring and guiding good people, respecting them, treating them as intelligent, competent adults and then letting them loose.

"We've got to simplify and delegate more – simply trust more. We need to drive self-confidence deep into the organisation. We have to … convince managers that their role is not to control people, but rather to guide, to energise, to excite." [6] Despite all the promises of management systems - whether in re-engineering, strategic partnerships, TQM, benchmarking, outsourcing - ultimately it is the efforts of committed people, working together that determine the success of an organisation. It is the efforts of people working together that produce sustainable success.

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IATUL

LIBRARY DIGITISATION PROJECT MANAGEMENT

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1. Introduction

Digital libraries are defined in many ways. A common understanding is that they are data repositories that are being newly created in digital form in databases, on Web sites, or from file servers in a variety of combined text and image formats. Such digital libraries may be achieved without recourse to pre-existing forms on legacy media such as paper or film. Conversion is not an issue in this environment.

However, conversion to digital form from existing media, is of particular concern to established libraries keen to fulfil their responsibilities in the areas of collection management, storage, preservation, and access.

A significant issue for library management is to balance access to print-based and electronic resources in a hybrid library environment. Many librarians feel a responsibility to provide an integrated environment that combines catalogue access to print and film material, with provision of direct pathways from reference databases such as catalogues and indexes through to digital source material.

Projects to produce digital libraries have been carried out in a wide variety of contexts. These range from the large scale that assume the creation of a wholly digital collection supported by a seamless digital metainformation framework, to small projects that involve selective digitisation of individual media. These smaller projects may involve simultaneous creation of finding aids that are independent from existing metadata.

Ranging between these extremes, is a variety of applications that in many cases are termed hybrid libraries, since they reflect attempts to provide digital search assistance for collections that are a combination of computer-based, print, film and other media.

Many of the applications lend themselves to a structured project management approach to implementation. Commissioning of many legacy automated library housekeeping systems has long since been carried out by information technology staff trained in project management techniques. However, digitisation project supervision in more recent times has often been carried out by professional staff who have had no project management training, and have adopted relatively *ad hoc* approaches.

2. Library project management

Recently there has been increasing recognition of the role that formalised project management can play in library processes. For example, Black (1996) and MacLachlan (1996) have described project management in the library context. Typically, project management can be organised into definition, formalisation, implementation and completion phases as follows:

Definition

Identification of the project, and individuals and teams to be involved; relationship to institutional objectives; briefing participants and stakeholders on origins; preliminary costing;

establishment of a business case.

Formalisation

Reviewing of objectives, specification of outcomes and identification of sub-tasks; matching of people with tasks; revision of costing, establishment of sequencing and reporting processes; risk assessment.

Implementation

Scheduling; sub-task accomplishment; coordination; testing; monitoring and modification.

Completion

Deliverable production; evaluation; reporting; maintenance and training.

The flexibility required of staff in today's workplace, means that utilising such a framework is often advantageous in the library context.

2.1 Digitisation applications

Digitisation projects necessarily involve management decisions on matters such as:

Collection analysis

Choice of that part of the collection to be processed; criteria for selection; consideration of current physical condition; extent of handling required; present physical storage alternatives; extent of development of finding aids, and how this access may be incorporated into the project; extent of resolution required in full text or image.

Resourcing

Estimation of size and extent of material; preservation methods during handling; database administration contingencies such as file naming, file storage and finding aid requirements; costing of test and production phases; consideration of outsourcing.

Project personnel

Project manager appointment; specialist library staff involvement; reskilling; employment of contractors.

Production

Preparation for scanning; digital formats capture and conversion from print, audio and video; compression choices; quality control through resolution, text error correction and review, sampling rates; working copy handling and backup; storage media; cost establishment through test runs through the digitisation chain.

Access and metainformation

Conversion of existing finding aids; creation of description and indexing at time of conversion; utilisation of standard metainformation formats and content description using authority files and thesauri; database and information retrieval software; integration with existing catalogues; Internet access through page development and macro-level description.

Intellectual property

Management, including determination of restrictions and obtaining clearances; mechanism for recording these within metainformation.

Identification of the procedures that are to be formalised and implemented, has been documented for general attention in digitisation projects (Kenney & Chapman, 1996; U.S. Library of Congress, National Digital Library Program, 1997). These can be paraphrased using U.S. NDLP headings, and assuming a hypertext style document as:

Selection for digital conversion
    Analyze for scope; determine access aid status; establish custodianship, format for conversion, physical condition and access restrictions.

Plan approach
    Develop methods for preparation & digitisation including preservation treatment plan, evaluation of physical condition; determine capture procedures and repository requirements in relation to files, finding aids and access restrictions; produce a workplan.

Produce digital collection and access aid
    Image and text audio video capture; modification of an existing finding aid or creation of a new one.

Store in digital archive
    Deposit items in digital repository with organised directories.

Create Framework
    Produce mockup and establish links.

Assemble digital collection
    Deposit document-style access aids in digital repository and generate indexes and assemble.

Test and refine
    Review assembled collection for accuracy and completeness and test links.

Release

There is growing interest in the effectiveness of the project management framework. Accumulated reports of digital initiatives such as those of the Association of Research Libraries (1999), Digitisation Forum Online (1999), University of Arizona Library (1999), and IFLA (1999), provide case study material. Software to support project management scheduling has been investigated by Chambers & Perrow (1998) in the UK academic library environment.

3. Australian projects

Some early Australian developments have been reported by Ianella (1996) within the broader framework of digital library initiatives including metadata development. Projects have been carried out principally by individual institutions. However, there have been collaborative projects such as the Australian cooperative digitisation project for which the National Library of Australia, the State Library of New South Wales, and Sydney University's Fisher Library have combined to digitise early Australian novels.

3.1 Public libraries

The larger public libraries, by virtue of the cultural heritage material in their collections, have in many cases embarked upon a range of intitiatives These institutions are more likely to support project management within a policy framework. So for example the National Library of Australia, in addition to its collaborative work has been developing access to its pictorial collection per medium of the *IMAGES 1* project that makes available digital surrogates of an increasing amount of its pictorial collection. Access to this material is available directly through the retrieval software, or indirectly through the Web-based general catalogue.

The State Library of New South Wales has embarked on a number of projects over recent years including conversion of an indexed analogue videodisc collection of 300,000 photographic images (now available through the Web), the scanning and transcription of Sir Joseph Banks *Endeavour Journal*, and the scanning of Utzon's Sydney Opera House plans These and other projects are carried out under a strategic digital library plan (Thomas, 1998).. This plan embodies principles such as a client focus, providing a mix of enhanced and unmediated electronic access, an orientation on unique and significant resources, and building upon intellectual assets. This has led to the identification of priorities concerning which resources to make available.

Planning documents that provide for digital material within overall collection management approach, constitute a similar framework for projects at other libraries. The State Library of South Australia has digitised its Mortlock pictorial collection (State Library of South Australia, 1999) with reference to an electronic data collections policy. Although projects have been primarily at the National and State level, more proposals are being considered for more modest endeavours such as the libraries such as the Norwood, Payneham and St Peters service in South Australia where a Website dealing with local history is planned.

Of course, public cultural collections are not confined to established libraries. A number of the larger museums and art galleries are investigating or undertaking projects to digitise images for Web-based delivery. These include object photographs at the Powerhouse Museum in Sydney, photographic material at the Australian War Memorial in Canberra. Such work has been given impetus by the pioneering work of ANU in art.

3.2 Academic libraries

There has been some collaborative work between University and public libraries, but usually the universities have worked independently on specific projects.

There have been many such projects, usually conducted on discrete identifiable collections of material. Many have embarked upon making examination papers available through web sites, and such projects have evolved into ongoing standard procedures. Some projects have tackled unique collections of material that is deteriorating and can benefit from Internet access. For example the University of Melbourne is working with old issues of its student newspaper *Farrago*.

Some have made use of external models of project management. For example, the University Sydney University's SETIS project (Cole, 1997), models itself upon the SGML framework and operation of the *Text Encoding Initiative*. It provides a concerted approach to versions of its own archives and rare books that are progressively being digitised, coupled with access to external electronic text publishers.

3.3 Special libraries

A number of university libraries in Australia have an administrative framework that encompasses special libraries. The nature of collections in these libraries is such that they provide good candidates for digitisation.

For example, The Queensland College of the Art Library at Griffith University under the project title Library Image Database Art (LIDA) is producing high resolution images of Australian art converted from 32,000 transparencies. Metadata for access in addition to creator, title and subject keywords includes art style, genre and period. The digitisation policy was developed for information services at the University to meet the needs of the electronic classroom

At Curtin University, the John Curtin Prime Ministerial Library produces an electronic archive of material relating to the former prime minister. The JCPML has developed an archive management framework document that establishes the principles and best practices to be applied and addresses the areas of cooperation, selection of material for digitisation, integrity, access, technology and systems, storage and back-up, networking, migration, and budget (Williamson & Henderson, 1998).

Special libraries more than most, are in a position to supplant legacy material with predominantly digital collections. In some cases host organisations with large publications outputs are actively creating digital material, and becoming a digital library in their own right. For example, the Australian Bureau of Statistics are moving towards complete provision of their source information digitally.

An interesting case is the Parliamentary Library in Queensland, which has a large copyright deposit collection of legacy material, but for much of its incoming material is endeavouring to provide seamless access through its *Concord* online catalogue to material such as digitised newspaper clippings, and digitised off-air videotapes. (parliamentary libraries do not have the same copyright strictures as other libraries in Australia). This is not so much a project, but integration of digitisation processes into all areas of the library housekeeping so that print and digital material together are described in a single networked hybrid catalogue which also links to the source material on request.

4. Looking ahead

Libraries that are seriously embarking upon digitisation programs in Australia, pay attention to a number of matters that support effective project management, and provide pointers to other enterprises wishing to enter into such projects. These include:

Policy framework

A policy for operation within a collection management framework that embraces:

- Attention to migration (the retrospective conversion of source materials), with an emphasis on intellectual content of material rather than concerns about elements of the digitisation chain.
- Attention to integration of metadata within evolving catalogues of legacy materials to provide a 'one-stop' interface to all aspects of the collection.

Training

Identification of continuing professional training requirements for staff, and differentiation between library technician and librarian roles.

Standards

Attempts to adhere to such principles as espoused by the National Preservation Office, or to use of Web-base metadata standards such as the Australian Government Locator Service's 17 tags.

Application

Utilisation of best practice in such a way that attention is paid to:

- Identification of digital resolution that is at least able to reproduce quality of original, for example by loss-less compression.
- Inclusion of backup provisions as expressed in the enterprise's disaster management program, and quality control provisions within the enterprise's adherence to quality control principles.

Monitoring

Performance evaluation through use studies with attempts to develop cost benefit metrics in comparison with established materials.

The choice of materials for projects and identification of training needs should be done on the basis of clearly formulated conditions (Grygierczyk, 1997; Hedstrom & Montgomery, 1998). The digitisation must be accompanied by adding value through the seamless delivery of materials via metainformation developed from its origins to support library housekeeping function.

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IATUL

ADAPTABLE NETWORK COOPERATE CATALOG FOR COMPLEX INFORMATION OBJECTS

From Single Library to a Consortium: Sharing the Management and Distribution of Information Resources

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The Problem

With the rapid development of communication technology there is a growing trend to share intellectual/information resources. The Internet in general and the WWW in particular opened new ways to share these resources. Organizations who's business is to supply information and knowledge are building new consortiums to deliver information in an efficient way i.e., fast, comprehensive and in the lowest cost possible. New tools are in order to manage shared resources in library networks (library consortium).

The need to team up stems from the growing amount of information and the growing costs of purchasing it. No one institution can afford to purchase, store and manage all the documents it will ideally want to hold. At the same time, library patrons demanded access to a wide range of information resources and services (including material lending, document delivery, etc.) exceeding their immediate organizational affiliation.

In order to share catalog records within a library network (consortium), a certain degree of unification of the resources and their representation is due. Despite the widely used library cataloging rules and standards, there is a notable discrepancy in the bibliographic, as well as holdings description between the different local library catalogs. Unification of record description, known also as the de-duplication problem, is a must in order to eliminate duplication of records and information presented to the patron (the same book should be listed only once in the result set even if it happens to be cataloged in more than one library catalog, although it should contain "pointers" to all libraries owning it).

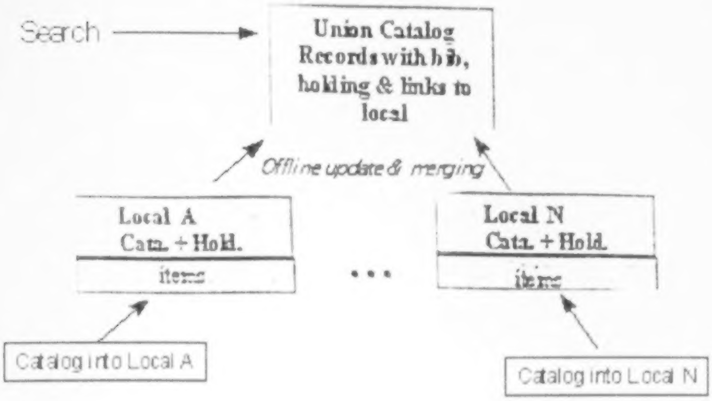
But, the growing demand to share resources does not eliminate the common desire to preserve organizational autonomy. Each organization (local library), within a consortium wants to preserve its unique way of information management. The fact that the vast majority of Library material is still stored as physical entities reinforces the requirement to preserve libraries' autonomy.

Thus, we are faced with the challenge of increased cooperative cataloging, requiring higher degree of unification without compromising local libraries independence.

Existing Solutions

A traditional model for cooperative catalogs is achieved by means of a Union Catalog which depends entirely on replication of data between the local libraries and the Union catalog. All relevant data that is to be searched and displayed on the Union catalog is stored there, in addition to its existence in the local libraries.

Traditional Union Catalog



There are, however, several drawbacks to this model: every update in records in the local libraries, e.g. new items added, data correction, change of availability status, etc., have to be reflected in the union catalog's "parallel" record, therefore heavy update traffic is induced. In addition, data replication require allocation of additional storage resources and allows for a lesser degree of independence for the local libraries, thus inflicts relative inflexibility.

A more advanced concept that is currently explored within the library information retrieval community is the Virtual Cooperate Catalog (VCC). A VCC includes an engine that enables a unified search and retrieval of records across diverse local library catalogs and systems. It receives queries, broadcasts them to the target libraries, merges the result sets in a unified set and presents it to the patrons in a unified format. The VCC contains no data and therefore changes in records in the local libraries does not require any update within the VCC.

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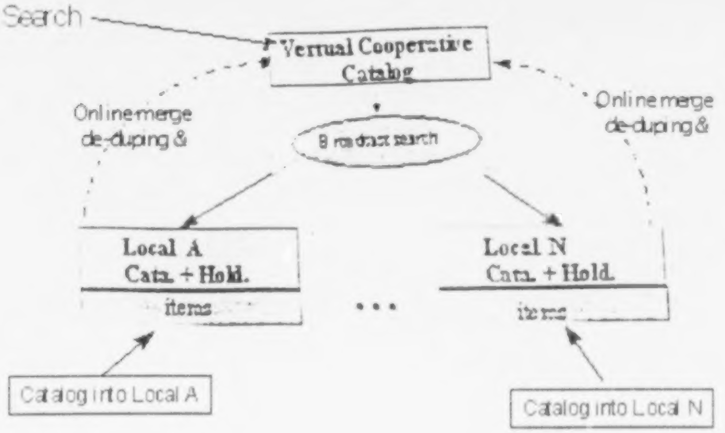

Network Cooperative Catalog

A VCC, when based on open standards such as Z39.50 and HTTP, potentially provides maximum flexibility for the organizations who are wishing to share resources. Although maximum flexibility is maintained in this model there are notable disadvantages: Since the VCC contains no data, all searches, retrievals, de-duplication and data merging, sorting and presentation, is done "on the fly" at the point of the query. This induces heavy traffic between the VCC and the participating local libraries, as well as extensive utilization of CPU to process the information before presented to the users which render the whole solution unfeasible.

The ALEPH Solution

The two models, the VCC and the Traditional Union Catalog, are in fact complementary in their achievements: The traditional union catalog, indeed speeds up Search time, since data and indexes are stored in the union catalog environment but this design more rigid and requires replication of data and update of all changes done within the local libraries. The VCC allows for greater flexibility and independence of the local libraries and reduces the update traffic to minimum, but, it requires significant network resources to transfer data, on the time of request, and requires processing resources to merge and de-duplicate data, sort it and present it to the patrons.

ALEPH500 library information system contains a special component, the ALEPH-Net, which offers a compromise between the two complementary, contradicting models for cooperative cataloging. It proposes a flexible model that can be tuned in order to achieve the best balancing between Virtuality and reality of data: a Network Cooperative Catalog (NCC).

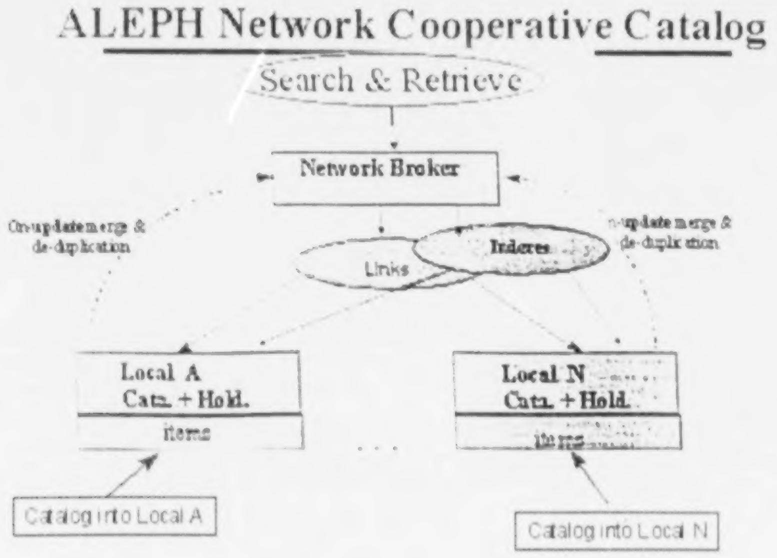
The basic conceptual and technological elements that underline the NCC are:

1. Distributed database design: In ALEPH, authority, bibliographic, holdings and administrative (circulation control, serials management, acquisition, etc.) data are maintained as separate, independent yet inter-related database units: Each such unit can have many occurrences with many-to-many links to the other database units. For example, one bibliographic catalog (i.e. Bibliographic databases unit) can be related to N number of administrative units which relate to N Libraries, each with its own administrative policies. ALEPH database design supports wide range of

database configurations and implementations, including independent installation of the different units on different hosts. ALEPH database design plays an important role also in its scaleability potential..

2. ALEPH-Links: In ALEPH, every record, within any database unit can be linked to any other record, within any other database unit. In practice, records which relate to one another are linked in one of a number of link-relationships (e.g. up, down, parallel, analytic, item, etc.) These links project a graph structure (or a Web of linked records), which defines for each database record its network neighbors with the relevant relation between the records. Whenever a record is updated a message to all its network neighbors is triggered, so that all its related, or linked records are informed of the modification. In addition, ALEPH-links is translated to hyper-links between records, for Navigation purposes, while displaying.
3. EXPAND option: all ALEPH application objects which relate to data indexing and data display include an EXPNAD method. With this option, a library can opt to add to any database object, information derived from any of its network neighbors. This prevails both for display and indexing purposes. For example, a bibliographic record of a monograph is linked to 3 administrative records describing 3 different copies of the book. EXPAND can be invoked to add to the monograph's bibliographic catalog indexes, also information which is included in the related administrative records, such as Barcode numbers, location or availability status, so that Patron could search the bibliographic record based on these data. EXPAND can also serve to "Virtually" incorporate external, non-ALEPH data into an ALEPH record. For example, to add the table of contents of a journal issue from a third party indexing and abstracting agency.

The basic design of an NCC model is composed of two components: the local libraries databases and a Network Broker database. The Network Broker serves as a Search Engine across the entire library network. Whenever a record is created/updated in one of the local libraries, a special de-duplication process is triggered, to check if this record is already present in the Network Broker. If it is, an ALEPH-Link is defined between the two records. If not, a new record is created in the Network Broker and is linked to the local record. NOTE: the Network record does not contain any data except for the link! Based on the ALEPH-links relationships, EXPAND is invoked and adds, for each Network Broker record, indexes derived from all network neighbors, i.e. from all its linked (local) records. The Network Broker contains indexes for all records in all participating local libraries, without relying on any replication of data. This means that the process of de-duplication is achieved during the index creation and updating, prior and not during the search! In addition, since indexes are maintained in the Network Broker component, search queries do not involve any networking. The effect of the above design is that search results contain one representative for every identical record within the network with additional options to **navigate** to the desired target local library record or just to display its bibliographic and/or holdings content of the record (**expanded** from the relevant local libraries).



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IATUL

Is the Customer Always Right? End-user Services in a Networked Age

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1. Abstract

This paper focuses on the changes taking place in the behaviour of those engaged in research and teaching as a result of the increasing availability of source material on the Internet. It first discusses who customers are and what they are using information resources for. It then looks at the range of new services that are on offer, and reviews a number of pieces of research which provide evidence for the way users are adapting to the Internet as an information resource.

It concludes by suggesting that user behaviour is complex and diverse. It suggests that there is evidence that it varies by age, by experience and by discipline, and that there isn't likely to be any one single approach to networked information provision that will meet the needs of all.

2. Introduction

As professionals in the library and information business, we are all aware of the increasing importance of the Internet in scholarly communication. There is evidence that teachers, researchers and students are increasingly turning to the network as their preferred information source. Yet there seems to be relatively little research into user behaviour in this rapidly changing environment.

This paper will examine some of the evidence that confirms that user behaviour is indeed changing, but which suggests that this is not always in expected or uniform ways. It will try to identify those services and facilities that different groups of users are finding helpful, and will speculate on which services are likely to succeed in the future, and whether or not libraries will be among them!

3. Users as customers

3.1 Introduction

Information professionals are given to employing the term 'users' to denote people who access their services. For some time now I have been uncomfortable with the term, because it has connotations of a captive audience. It isn't a term you hear in the commercial world – Ford doesn't have 'users' of its cars, it has 'customers'. This seems a more appropriate term to use in the increasingly competitive world of information services, when members of teaching and research institutions have a plethora of sources to draw on, not all of them provided directly by their host organisation.

3.2 Who are they?

This has become an increasingly difficult question to answer. In the UK, when I was a student in the early '60s, a relatively small proportion of the UK population (between 5 and 10%) attended a university degree course. They went to a fairly small number of universities, more often than not in a town or city remote from their home. 'Going to university' meant a journey away from home, both literally and in other ways too.

Today the picture has changed enormously, and I suspect that the changes in the UK are echoed in other countries. It is acknowledged though that there are large variations across the globe. The UK, for example, appears to be moving towards a US model for higher education. The participation rate has increased to around 35%, and the number of institutions offering degree courses has multiplied by a factor of three. The economics of higher education have changed too. State support for the living costs while studying is now only available to those on below-average incomes, and recently we have seen the introduction of tuition fees. There are many more mature students too and the average age of a student is now said to be over 21. The combination of these factors has resulted in many more students staying at home while attending university, and interested in using information resources and even course modules remotely via dial-up telephone links.

3.3 What are they doing?

The manner in which education is delivered and the ways in which students perform their studies has also changed greatly. Teaching has become more 'student centred', despite the fact that the teacher/student ratio has dropped significantly with the growing numbers of students. There is more emphasis on project work, and services such as our own bibliographic database services suggests increasing numbers of accesses by undergraduate students. The usage graph of our ISI bibliographic database service over the last 8 years (Fig 1) shows a steadily increasing differentiation between peak usage during term time, and the troughs during the vacations, suggesting heavy undergraduate usage of a service that might primarily be thought of as a research resource.

3.4 Users as customers in a networked world

Part of this change can be attributed to an increasing awareness of the internet by new students who have learnt about it at school and at home. More and more students arrive with at least some computer skills, and this trend will certainly continue.

Meanwhile, the network is providing opportunities for institutions to market themselves to their customers. And this doesn't mean just advertising their courses. An increasing number of institutions are offering distance learning options, with the internet as a key component.

4. New customer services

4.1 Introduction

So what services can this new generation of students expect from their host institutions? There are many and their diversity seems to be increasing all the time.

4.2 Searching tools

There are many tools available now for using the network to track down material that is published somewhere on the network. Search engines try to catalogue the whole internet with varying degrees of success. It is interesting to try a search term on several of the major search engines such as Alta Vista, Yahoo, Lycos etc and compare the results. There are suggestions that the network has already grown too large for this approach to continue to be effective, and anyway, they cannot 'see' material that is only available behind authentication gateways.

Library catalogues are the traditional way to find out if a library has a particular item at the book or periodical level, and there are now on the network several combined catalogues that have become information resources in their own right. COPAC [1]in the UK is an example of this, combining the catalogues of 15 or so major research libraries.

Bibliographic databases provide information at a finer level of granularity, describing individual articles in published journals, and enabling people to search using key words or phrases or author names. These have been available for several years now, and our experience with the BIDS [2] service suggests that they have become very important to researchers. A recent survey elicited the following comment from one respondent which was not untypical "I don't know how we managed before there was a BIDS service! I am a regular user and I find it an essential requirement for keeping track of publications in my areas of interest." Although referring to this specific service, it is fair to surmise that this comment can be generalised for all bibliographic data services, whether networked or on CD-ROM.

4.3 Full text services

The current big area of development is the delivery of full text articles to end-users over the network. There are many different services available at the time of writing, and undoubtedly many more about to appear. They can be broadly divided into those provided directly by publishers and those provided by intermediaries. Some of the larger publishers have been providing access to the full text of their journals from their own web sites for several years now. One of the best known is the Academic Press IDEAL [3] service, with mirror sites in the UK and the USA, providing access to a collection of over 180 journals as a 'package deal'. There are many others, not least Elsevier's Science Direct Service [4]. All of these services depend on users visiting their company web site and using their own search interface.

An alternative approach which is gaining ground is access via some sort of consolidation service. Subscription agents have been at the crossroads between publishers and libraries for many years, and all the major ones, such as Swets [5], EBSCO [6], Dawsons [7] and Blackwells [8] have capitalised on their position to set up electronic services, with combined bibliographic databases of articles from a range of publishers and links to full text. Other organisations which have been networking bibliographic databases for some years have also joined the full text club. One of the best known is OCLC [9]. My own organisation, now known as ingenta [10], has also been offering services in this area for a couple of years. At the time of writing over 1000 journal titles are available through the ingentaJournals service, either through a combined database, or indirectly through well known bibliographic databases such as ISI's [11] Citation Indexes, with hypertext links from the search results screen to the full text (Fig 2).

Each of these services offers different economic models. Many started out charging for access to the combined bibliographic database of full text articles, as well as charging for access to the journals themselves. Some have now changed their policy and have moved towards the same model that ingenta is using, namely providing totally free access to the database on the 'shopping catalogue' model, and only charging for articles on a subscription or document delivery model.

4.4 Focused services

All the above services tend to be general services not specific to any particular discipline. Exceptions are some of the bibliographic databases which have emerged with particular subject specialisations. Two well-known and respected examples in the medical field are Medline [12] and EMBASE [13]. In the engineering field, Compendex from Engineering Information is a popular product.

In recent years there has been growing interest in trying to provide some sort of structure for the resources that are available over the network, to guide those working in a particular area of research or teaching towards information and services that are of particular interest to them. Such an approach is not new. Before the huge growth of the Internet, ISI published their Current Contents booklets, containing copies of contents pages from a large collection of journals. These were published in a number of different editions for different discipline areas and were extremely popular. Libraries also routinely organise their physical collections into subject areas, with different disciplines being catered for on different floors or sections of the building, or even different buildings. And departmental libraries are also common, with collections focused on the interests of their particular discipline.

So it seems a natural development to emulate these structures in electronic services. Three recent initiatives in the UK in the area of organisation of electronic resources are 'Clumps', SBIGs (Subject Based Information Gateways), and Hybrid Libraries.

Clumps is the rather unusual and slightly inelegant term that is being used in the UK at the moment to refer to a set of projects that are experimenting with creating services that will simultaneously search a number of different resources via a single interface. Communication between the search system and the target services uses the Z39.50 protocol. There are currently four Clumps projects [14], three involving geographic-based clumps (Cairns – Scotland, M25 Link – London, and RIDING – Yorkshire and Humberside), and one focusing on a subject-based clump (Music). Some of the projects involve public libraries as well as academic research libraries.

Subject Based Information Gateways (or SBIGs) have been around in one form or another for quite a while now. They work by providing links to a number of subject-related resources, together with descriptions of them. They tend to be hand-picked, described and catalogued, with links regularly checked and updated. Outside the UK, there are semi-commercial offerings such as Ei Village [15] from Engineering Information Inc. Examples in the UK include SOSIG [16] (Social Sciences Information Gateway), EEVL [17] (Edinburgh Engineering Virtual Library), and OMNI [18] (Organising Medical Networked Information). The creation, building and maintenance of subject gateway services such as these has been encouraged by the ready availability of a toolkit known as ROADS [19] (Resource Organisation And Discovery in Subject-based services).

The term Hybrid Libraries is being used to describe services or initiatives that are working towards integrating access to resources, whether electronic or print, in as seamless a way as possible. The concept recognises the fact that libraries are going to contain a range of resources delivered by different technologies for many years to come, and the idea is to develop systems to integrate access to these resources in a working library environment. A recent article [20] in D-Lib describes the concept of hybrid libraries in some detail.

5. What do users like?

5.1 Users are people

Earlier in this paper I suggested that the term 'users' was inappropriate in the 'free market' Internet environment that we all work in nowadays. I proposed the term 'customers' as an alternative, but of course what we are talking about is people. And we know from everyday experience that people are all different. In particular, the students, research workers and academic staff that populate our education and research establishments are human beings with a variety of experiences, knowledge, interests and working methods.

Although such generalisations are dangerous, it is sometimes suggested that those who are attracted to the sciences tend to be somewhat introverted, convergent thinkers, while those working in the arts and humanities are more outgoing, outward looking and open to new ideas. Even if this is unfounded, we all know that people have different methods of approaching work and study.

Another factor relevant to the subject of this paper is the fact that, in the context of the use of computer and network based resources, people are changing. By this I mean both that individuals are gaining experience, and that each new generation of students is arriving at university with an increasing awareness and familiarity with computer-based information systems.

One more issue that is relevant is the fact that, given the choice, people generally like to control the environment in which they work and study. They exercise this choice by having preferences for different computer systems, word processing packages and other tools, network browsers etc. Although the vast majority of computers in use are Windows based PCs, running packages such as Microsoft Word, a closer inspection of individual machines shows a huge variety of detailed different settings and options, expressing the preferences of the user.

Taking this idea a step further, there is some evidence that, given a choice, many people prefer to use a remote information system in as local a way as possible. This manifests itself, for example, in people conducting fairly crude searches on the remote system, then fetching the resulting large hit set back to their own computer and refining it using local tools such as word processors or bibliographic database packages.

In the remainder of this paper, I will examine evidence from a number of different sources to back up this claim of a very heterogeneous user population grappling with a large and growing range of services in a variety of individual ways and suggest how, as information professionals, we should react to this variety of user needs and behaviour.

5.2 Experience of BIDS/ingenta services

5.2.1 Description of services

I will start by looking at my own service, widely known as BIDS, now jointly owned by the University of Bath and a new company called ingenta ltd.

BIDS offers a range of services, though it is best known for provided end-user access to the bibliographic databases supplied by ISI known as the Citation Indexes (Science, Social Sciences and Arts & Humanities). We also mount the ISI proceedings database ISTP, together with a variety of other bibliographic database services such as EMBASE, Compendex, INSPEC, etc. The establishment and growth of the service has been well documented [21].

Since 1997 we have also been providing access to a range of full text journals supplied by a number of leading publishers. This service, now known as ingentaJournals, will soon have over 1000 journal titles mounted and available to subscribers. The service is cross-linked to the bibliographic services so that search results from, for example, the ISI Social Sciences Citation Index, will show a hypertext link alongside articles in the results display where a full text article is available in ingentaJournals (Fig 2).

The use of the these services, and the ISI service in particular, has grown steadily since the service was launched in early 1991, and at peak times over 12,000 people a day login to the ISI service alone. With over 300,000 accesses a month, it is clear that a very large proportion of the UK HE population is aware of the service and makes use of it. And there is evidence of further unsatisfied demand for it, since we have had to turn away a large number of attempted accesses this year (1998-99) because the system is fully loaded.

The first point to make is that this one service has clearly made a mark on the research methods of this group of users. In other words, the existence of the service has changed the way in which they go about doing background research for new projects, check references for papers they are writing, check on progress with other competing research groups etc.

The second point is that there is evidence that the service is being used in ways that might have been difficult to predict. The service is available through three different interfaces – the original telnet interface, an early web interface, and a more recent web interface using frames and JavaScript. One of the puzzles was why so many people were continuing to use the telnet interface, especially as there were several facilities only available on the web. A survey [22] was commissioned and it was discovered that many were using telnet as a conscious choice. They knew how to use it, were trained on it, and found it to be much quicker than the web interface. They had tried both, but come back to the telnet interface.

Fig 2 - Screen Shot – BIDS ISI Citation Index Service Showing Full-text Linkage

Another surprise which emerged from a survey of users of the web services [23] was the very large number of users who, even with the web interface, choose to have their results e-mailed back to themselves (61% overall, 69% of those who classed themselves as 'researchers'). This contrasts with only 8% who choose to download their results immediately into a file from the browser. Having captured the results, 29% then manipulate the results locally using a personal database system or a word processor. This rises to 40% for teaching and support staff.

A further example of people's desire to move the centre of gravity of their activities from a remote service to their desktop is the immense popularity of a current awareness service introduced last year called 'AutoJournals'. This allows users to nominate up to 50 journals of their choice; then, whenever details of a new issue of a chosen journal is loaded into the system, it automatically e-mails the information to them, typically in a table-of-contents format. Even with relatively little publicity, over 10,000 lists have been set up since the facility was launched last year.

Finally, in the last 6 months or so, we have had an unprecedented number of enquiries about the possibility of Z39.50 access to the ISI service, apparently prompted by the introduction of a Z39.50 interface with the EndNote package. This is now being introduced. Again, an example of the popularity of moving control closer to the user.

5.3 Australia & New Zealand experience & survey results

5.3.1 BIDS IBSS Online service to Australia and New Zealand

In 1998, over 30 universities in Australia and New Zealand took part in a 3 month trial of the networked BIDS bibliographic database – IBSS Online. The International Bibliography of the Social Sciences is a UK-based service [24], supported by the JISC (Joint Information Systems Committee) and the ESRC (Economic and Social Research Council), and managed by the BLPES (British Library of Political and Economic Science) at the London School of Economics. As a result of the trial, 10 Australian and New Zealand universities are now subscribing to the service.

The database covers over 2,300 social science journals per year from over 100 countries. Although database entries include a number of descriptive fields such as discipline codes and subject and geographic descriptors, very few of the articles currently have abstract texts (though these will start to be added this year for about 50% of articles).

At the end of the trial, an e-mailed survey was sent to each of the 32 participating universities, of which 26 were completed and returned. A significant outcome was the importance placed by sites on the time span of the database (which covers material back to 1951). 18 respondents marked it as a very attractive feature and a further 6 as marginally attractive.

As for links to full text, although this was marked as being of significant interest by most sites, for those that purchased the service, it wasn't a major factor in the purchasing decision. This might be because full text is only available for about the last 3 years, a small proportion of articles which span nearly 50 years of research. So, for this particular group of users (social scientists), the half a century time coverage appeared to be a more important factor than the ability to link directly to full text articles.

5.3.2 'Information Online and On Disc 99' Conference (Sydney)

In January 1999, the biennial 'Information Online and On Disc 99' conference and exhibition [25] was held in Sydney, Australia. The author, who presented a paper at the conference, took the opportunity to review what else was being discussed.

Looking through the papers, it is notable how few were focused on issues related to user needs and user behaviour. Roxanne Missingham from CSIRO [26] presented a paper under the 'Future Trends' theme entitled 'Science and Technology: a Web of Information – Impact of the Electronic Present and Future on Scientists and Libraries'. In this she looked at two perspectives on information discovery, one from the point of view of librarians, the other from the point of view of scientists. For the library, the main change from the 70's and 80's to the 90's was the move away from a highly structured information chain, with search specialists and libraries central to the process. The 90's saw the arrival of end-user access to networked resources resulting in users carrying out their own searches, and only coming the library after the event to supplement and evaluate the outcomes of inadequate searches. The result is a quickly changing role for science librarians, with an increasing need to develop specialist subject knowledge, to work more closely with researchers, and develop skills and knowledge of publishing and resources.

From the scientists point of view, she notes the major impact networked services have had on the time and effort needed to review literature at the beginning of a project. She also notes the importance of the role of browsing for keeping up to date in an area, and the fact that networked services don't improve browsing efficiency to the same extent as searching. A survey carried out in 1997 looked at what clients wanted from libraries. It was found that they valued service and quality, up-to-date information. Timeliness was an important factor. There were age differences with, for example, older staff giving a lower priority to the library web site compared with younger staff. There were discipline variations too, and an example is biologists particular need for access to current material, and their quickness to take up services such as Medline and full text electronic publishing. Finally she notes complex differences in information needs by age, stage of career and stage in the research process, and differences in what is available in the information market in different disciplines.

In the Digital Libraries Forum, Peter Lyman talked about 'The Social Functions of Digital Libraries'. He posed the question 'What should a digital library be and do?' He pointed out that the digital library is still a metaphor, not yet a social institution. He suggested that the future is very unlikely to be like the present, and that there is an historic change taking place in the relationship between information and the economy, from energy-rich to information-rich. If information is a raw material, Lyman suggests that value shifts from information itself to its use, and from producer to consumer, and a possible key to success is providing more services. Finally he states that it is more important to envision the digital library that we would like to build than the one we may be forced to accept. In a pre-conference workshop, Lyman had also pointed out that at Berkeley library, circulation figures were down for the first time, and that the Web has become the information resource of first resort.

Dr Patricia Milne from the University of Canberra noted in her paper 'Electronic access to Information and its impact on Scholarly Communication' that research has shown that disciplinary culture does affect academics' adoption of the new technologies. She quotes Peter Lyman as saying that as academic libraries moved from collection building to access, in many cases scholars were not consulted. Although she admitted that the study comparing differences in behaviour at the Australian National University (ANU) between 1991 and 1994 was rather old, she claimed that the number of empirical studies relating to academics' use of information and communication technology still remains small. The study noted distinct differences between disciplines. Social scientists for example rated libraries as less important to their work than their personal collections. Scientists showed a particularly strong move towards do-it-yourself searching, and scientists reported networked access to online database as very important. There was a change in the pattern of visiting the library, with few daily visits, but more frequent weekly or monthly visits. There was also a decrease in the number visiting rarely. She concluded by saying that advances in ICT will continue to affect the working patterns of academics, and although the number of studies on this issue are small, she claims the changes will affect "in the broadest sense, the whole of society".

Lynne Brindley (Librarian and Pro Vice-Chancellor from the University of Leeds in the UK) in her paper reviewing eLib – the UK's Electronic Libraries Programme [27] – commented that the ways in which academics use journals hasn't changed much during the life of the programme, with most still wanting print copies for annotation. With the exceptions of a few key disciplines (Physics, Computer Science and Mathematics) deep cultural changes will need to take place before there is large scale system-wide uptake of innovative scholarly communication.

5.4 Corporate users

A recent one-day conference organised by the UK Serials Group [28] entitled 'Electronic Journals in the Corporate Environment' reviewed the issues surrounding the use of journals in the non-academic sector, and demonstrated that there are some important differences. Martin White summarised some of these as:

- Academic users – just-in-case, authors, networked, research and teaching driven, single geographical place, professional library support
- Corporate users – just-in-time, readers, intranet/extranet users, project-related, multi-national, multi-site, limited professional library support

Roger Brown of SmithKline Beecham reported on his company's experiences with e-journals. In general, they wanted unbundled titles, easy authorisation (ideally by IP address), timely delivery, and a range of price options including buying by journal title or by article. The positive characteristics of e-journals were perceived as being publication before paper, simultaneous access by many users, the ability to integrate material with other work, access from the desk, and speed of access. The negatives were problems with ergonomics and eye strain; users found browsing on-screen tiring and scanning difficult, they regretted the lack of serendipity, and criticised the quality of the graphics and figures.

In the future these commercial users wanted to see more titles, progress on licensing to ease the problems of access by members of large, multi-national companies, and linking from current awareness services to full text delivery.

5.5 SuperJournal project findings

The SuperJournal project [29] was one of the flagship projects in the UK's JISC eLib programme. It was a 3 year research project (1996-98) focused on electronic journals and involved 16 publishers and 15 universities. Its remit was to investigate what academic researchers value in electronic journals, the factors that will make them successful in the future, and the implications for libraries and publishers. Although a full report on the project has yet to be published, a recent one-day conference presented an overview of the project's major findings, a few of which are summarised here.

The core user requirements were identified as:

- Fast and easy access to a critical mass of journals
- Functionality including browsing, searching and printing
- A substantial backfile of between 5 and 10 years (depending on discipline)
- Gateways supporting 'one-stop shopping' facilitating discipline-specific discovery

Key user benefits were identified as convenience, keeping up to date, saving time, and managing journal literature more easily and efficiently.

The project identified differences in behaviour between science and social science users. Science users were said to be more competitive and spent more time checking on what was being published in their area. Social Scientists were more task-driven, using journals to write an essay, prepare a lecture etc. Scientists particularly appreciated high quality graphics, especially colour. Both groups valued printed journals as being easy to read with high quality presentation. They liked to photocopy articles in order to 'own' them, annotate them, store them.

The availability of e-journals resulted in fewer visits to the library, though e-journals were not seen as a replacement for the library which had other valued assets, especially the staff. Rather they were viewed as a replacement for the *process* of getting copies of articles quickly and easily without a physical visit. They were also seen as a way of extending the range of journals consulted.

Users valued the notion of journal clusters (a feature of the project which concentrated on four specific subject areas; Molecular Genetics & Proteins, Polymer Science, Communication and Cultural Studies, and Political Science). The size of the cluster thought to be ideal varied, some wanting around 20-50 journals, others 100-500. The number thought relevant to any individual was much smaller, around 5-10.

A backfile of 5-10 years worth of journals was thought to be very important, with Science users averaging 7 years as their ideal, and Social Scientists averaging 11 years. This would seem to be a major constraint slowing the early take-up of e-journals in a big way, since there are very few mainstream publishers providing electronic access to more than about 3 - 4 years worth of material at the time of writing. It also suggests that Science users might be satisfied with e-journals as their mainstream source of material earlier than Social Scientists.

One of the purported advantages of e-journals is the ability to create added value by including multimedia content, such as sound or moving images. Although 61% of authors used some form of multimedia in their work, only 36% thought being able to include this material in journal articles would be an advantage. Another eLib e-journal project, focusing on organic chemistry (CLIC) [30], found a similar reluctance by authors to bother with multimedia.

Finally, users still value print, with most printing out articles rather than reading on screen. Many said that annotating articles helped them understand them. Almost universally, users preferred to print PDF files rather than HTML. When viewing on screen, HTML was liked for web applications, but the poor presentation of tables and equations was criticised.

In her summing up of the one-day conference, Lynne Brindley commented that the project highlighted the urgent need to continue to track changing user behaviour. She also made the point that libraries have always been second best to scholars own personal collections. She emphasised the importance of a rigorous national strategy on the creation of a sustainable archive, and the importance of new strategic alliances mixing collaboration with competition. ***5.6 Summary***

So what conclusions can we draw from this collection of evidence? Perhaps the first and most obvious point is that the ready availability of a technology does not guarantee its immediate take-up and exploitation. People (customers) have to perceive some personal advantage before changing well established practices. Nevertheless younger, more IT- and network-aware academics and students are showing signs of a greater readiness to embrace new technologies and new methods of working.

We have seen evidence that although changes are taking place, the speed of adoption of new services and opportunities varies both with subject-specialisation and age. There is clear evidence, for example, of differences between scientists and social scientists. Scientists seem to be taking to electronic access more quickly than social scientists, tend to be less put off by the limited time coverage of most services, and in a competitive research environment, value the ability to quickly check on what others are publishing. With their need for a more diverse mix of sources, especially books, social scientists are less likely to find network resources to be central to their work.

In general, users tend to be pragmatic, with pretty interfaces being much less important than speed and predictability. Many academics need to refer to material published over a much greater time-span than most electronic journals, and even many bibliographic databases. While they appreciate the speed and convenience of on-screen delivery, they still see their library as an important resource, not least as a source of support and guidance, as well as material not yet available electronically.

There is evidence though that the ability to access full text articles electronically from the desk-top is seen as extremely attractive, with the only major negative factors being the limited amount of material currently available, both in terms of numbers of titles and time span covered. Despite this, having identified an article using the network in this way, most people still click the 'print' option to read, annotate and file it.

Many (most?) academics like to be in control of their information environment. Personal database products such as EndNote are popular, presumably because it enables them to use more efficient technologies to manage their personal collection of reference material. Several examples were quoted where users seem to prefer services that move the centre of gravity of their interaction with services closer to their desktop. E-mailing of search results for further sorting and processing seems very popular, as are current awareness services that deliver to the users mailbox.

One area where users do seem to appreciate remote services is where those relevant to their particular discipline are gathered together in one place, such as Subject-based Gateways or portal sites. These are electronic metaphors for the physical subject areas of general libraries, or departmental libraries. Nevertheless, they will still be only one of a portfolio of reference services that any one student or researcher are likely to want to consult, not an answer to all their information needs.

Conclusions

My first conclusion is that we are in increasing need of research into how user behaviour is changing as new services and new opportunities for changed methods of research and working evolve. This research needs to be ongoing, as clearly both services and people's experience of them is changing all the time. All parts of the information chain need to understand what is going on in order to adjust their services to best effect.

What does seem to be clear is that the Holy Grail of one all-purpose service satisfying the needs of all users, or even a section of them, is simply not going to be possible. The information needs vary too much by discipline, by age and by experience for this ever to be achieved. This isn't to deny the value of gateways and portals. In the increasingly complex world of the Internet, some sort of structure is clearly to be welcomed, and these sorts of services will surely increase in number and value. In the UK, the efforts being devoted to make the idea of a Distributed National Electronic Resource (DNER) a reality seem likely to bear fruit, though there is a wide variation in opinion as to precisely what form it will take.

So to try to answer the question in the title, is the customer always right? Despite the cynical comments from some parts of the information profession, in the end it is a service industry and if it doesn't deliver the goods, the users of the services, the customers, will vote with their fingers and go elsewhere. In the world of high speed international networking, for both research and teaching, this is becoming an increasing reality. It is our job to try to understand our customers and their needs in order to better serve them.

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IATUL

Information literacy courses at graduate and postgraduate level: some experiments and some experience

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Introduction

This contribution focuses on some official courses for which I am responsible. These courses are all related to information literacy, information technology and information retrieval. They are organised at the Vrije Universiteit Brussel (V.U.B.) and at the Universitaire Instelling Antwerpen (U.I.A.) which is part of the University of Antwerp (U.A.), in Belgium. The levels of the courses are

- 3rd university study year
- Master (postgraduate studies)

In these times of evolution towards increased importance of information sources based on computers and on the Internet, in comparison with the hard copy collection in the libraries, information literacy has become more important than ever, so that the virtual information sources become as visible for the users as the printed volumes on the shelves of classical libraries. This increasing interest in information literacy is refelected by many publications (see for instance Oberman 1998).

This contribution deals with some experience of a person (colleague?) who combines functions of university librarian for science and technology, and professor So this paper may be of interest to other people involved in training and teaching in the same area(s).

The contents of the courses

More precisely than "information literacy", the chapters of the course material have the following titles:

- About "information"
- The information industry and the information market
- Classifications and thesaurus systems
- (Assessing the influence of scientific journals)
- Computer technology
- Computer software
- Disks
- Compact Discs
- Multimedia / Hypermedia
- Data communication, computer networks and Internet
- Remote terminal login and file transfer
- (Gopher and veronica)
- World-Wide Web = WWW
- (Developing WWW documents and sites)

- (WWW extensions)
- (WAIS, Z39.50 and SR)
- Data communication, computer networks and Internet
- Remote terminal login and file transfer
- (Gopher and veronica)
- World-Wide Web = WWW
- (Developing WWW documents and sites)
- (WWW extensions)
- (WAIS, Z39.50 and SR)
- Online access information sources and services
- Electronic mail
- Computer network interest groups
- The future of computer networks
- Client-server systems
- Evaluations in information retrieval
- Document delivery and interlibrary lending

The chapter on "Online access information sources and services" is the largest. It forms the core, the most important part. The titles in brackets indicate that these chapters are less important or part of the more specialised courses only.

Components of the courses and of the course material

More concretely, the following components of the courses and of the course material are presented.

1. A brief overview of the contents of each course, which is made available through the WWW in the official framework organized by the university

These pages are part of the official WWW pages of the Vrije Universiteit Brussel (V.U.B.). Here we have to comply with the rules and guidelines established in the framework of the European Community study exchange programmes.

2. A document for each course, with an overview of the contents, the aims and the evaluation procedure

This is an extension of the official course descriptions made available by the University, as mentioned above. The most important addition is a detailed description of the evaluation procedure. Thus it is the most important document for a student who wants to obtain a credit for the course. These texts are maintained using Microsoft Word. They are printed and distributed to the students registered for the particular course. They have also been made available through the WWW for everyone interested -- colleague teachers as well as students -- in Belgium and abroad. They form part of the personal WWW site of the author at the V.U.B., which is available from

http://www.vub.ac.be/BIBLIO/personal/Nieuwenhuysen/courses/index.html

For the creation and maintenance of this Web site, Microsoft FrontPage 98 is used.

3. Series of slides (presentations) about the subjects covered by the courses

These are created with Microsoft PowerPoint 7 from the Office 97 software suite. The presentation files are used directly for projection during the contact hours. The language used is English to make the material suitable for an international audience. The presentation files form also the basis for printouts that are copied and published by the V.U.B. (For instance Nieuwenhuysen 1998 is the most recent edition). A paper has already been published about this work (Nieuwenhuysen 1995).

More recent developments include the following:

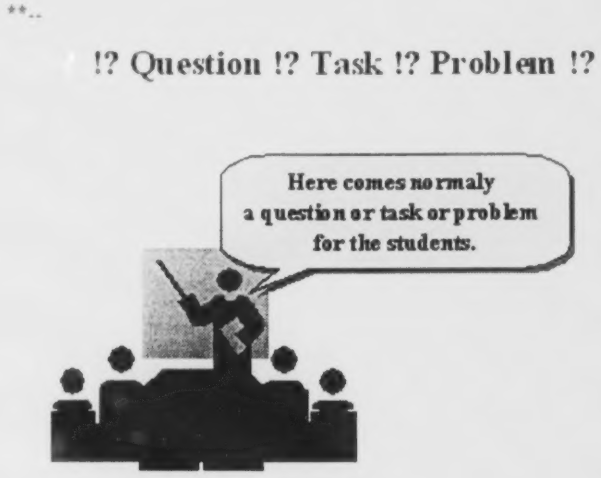
- The presentations are updated almost continuously and they have been extended.
- Each slide is ranked on a scale of importance, by 1,2 3 or 4 stars/asterisks: *---, **--, ***-, ****; short basic courses only touch on the most important topics; this helps students a lot in making the distinction between core material and additional, less important aspects of the course contents.
- Furthermore, some more advanced techniques have been applied, such as the inclusion of links to small video files, and animations in slides, mainly to illustrate flows of information.
- Some of the presentations have been put on the WWW as examples after conversion to HTML + GIF format.

The new technical features of the software are welcomed. However, some minor technical problems have been observed:

- The animated slides are not saved automatically by PowerPoint to .gif files for distribution through the WWW
- The text versions created besides the graphical versions of the WWW version are not useful, when the original PowerPoint slides offer their message in more ways than just by one simple text, for example with tables, images, arrows,...

4. Questions, tasks, problems, practical exercises for the students

These are included here and there in the presentations mentioned higher, in the form of slides that are all formatted similarly to distinguish them well from the other, normal slides that offer some course contents, as shown in the illustration.



**--

!? Question !? Task !? Problem !?

Here comes normaly
a question or task or problem
for the students.

These slides are used in the course sessions to guide the discussions with students. Afterwards they allow the students to check / test / assess their own level of understanding.
For many of these questions, an answer is provided in the form of one or several slides, following the particular question.

5. Descriptions of small assignments to be carried out by the students during the study year between the course sessions

These are included in the slides of the presentations as a subset of the specially formatted slides with questions, tasks and problems. The aims of these small assignments are

- to stimulate discussions and involvement in the course,
- self assessment by the student, and evaluation of the level of the students.

6. An extensive bibliography about the subjects covered in the courses

Hundreds of references are included. This is in the form of a file created with Microsoft Word 7 from the Office 97 software suite.

A suitable style sheet has been created, which allows easy additions, and also automatic and consistent formatting of the bibliographic references; this is based on the division of each reference in a limited number of fields which are here paragraphs, each with a particular "style". This style determines automatically the format of the field/paragraph as well as the style of the following, subsequent paragraph/field/style.

The bibliography is divided in chapters, in such a way that each chapter corresponds to a presentation. The bibliography is printed for publication together with the slides; each printed version of a presentation is followed by the corresponding chapter of the bibliography. (For instance, Nieuwenhuysen 1998 is the latest edition). The bibliography is regularly updated.

The file is also made available through the WWW. A problem here is that conversion of the file to HTML format by Word does not work, probably because of the high complexity of the document. Besides the original version in the Word document file format, a simple unformatted text version is also put on the Web, because this can be indexed by Internet search engines, so that the bibliography can be retrieved.

7. Case studies to be carried out by each student as part of the evaluation procedure

Most case studies simulate the preparation and presentation of an advice for a senior member of personnel in an organisation, in other words, these studies have the character of consultancy work. Each student presents the results of her or his individual case study in the form of a written report. In the exam period, these reports are discussed in a group with fellow students and the professor, to increase the real life atmosphere and to motivate the students. In some cases the results are even presented by the student to an audience of fellow students who play the role of members of the board of the institute that has asked for the consultancy. In this way the exams form an extension of the teaching. A student made the remark that she learned more during such an examination session than during the normal course sessions; this can of couse be interpreted in various ways, but at least it indicates that this format for an exam deserves more experimentation.

8. Communication with students using electronic mail

E-mail becomes more and more important in teaching and studying.
Through e-mail

- the students ask questions and receive replies and also from fellow students and from the responsible professor, and
- the students submit small reports to the professor.

A problem here is that the professor must spend many hours on e-mail communication with students, besides the normal classical contact hours.

The computer programs applied in this work

The computer programs applied nowadays to create and maintain

- the documents is Microsoft Word 97
- the slides is Microsoft PowerPoint 97
- the Web site http://www.vub.ac.be/BIBLIO/personal/Nieuwenhuysen/ is Microsoft FrontPage 98

The software tools used to maintain the course material evolve at a high speed. That can be seen as a problem or a blessing: On one hand some consequences are that much time is needed to study the changes and to convert the material to the new formats, and that not all conversions run without problems, that the results after conversion are often far from perfect, and even worse: that some errors may creep in unnoticed (For example, the conversion from the previous to the most recent verion of PowerPoint caused an inversion of many arrows in the images on the slides...).
On the other hand, the new or improved features of the new versions of the software packages are usually attractive and ask for experimentation and evaluation.

Further work and evolution

First some facts:

The fast evolution of information technology causes also a fast evolution of

- the contents of this kind of courses
- most educational tools and methods (WWW, e-mail, computer programs)

This offers advantages (for instance many new, exciting, "cool" aspects of the course contents), but also problems (for instance, updating programs and course contents is quite time consuming).

Information literacy is important for everyone, in all countries, including developing countries. We observe a shortage of teachers, for instance in developing countries like Tanzania, Kenya,...

There is a growing need for educational methods that allow study at any time and any place, towards the "virtual university" (still based on printed material, but also on WWW and e-mail). Terms related to this tendency that are used more and more are

- "from teaching to learning"
- from "teachers" to "learning managers"
- "lifelong learning"
- "distance learning"
- "flexible learning"

Development of course material and application of Internet in teaching are time consuming and not without difficulties.

All these facts have lead us to conclude that a central framework and service is needed in each university to assist professors in this part of their work. Therefore, a few colleagues and myself have submitted a project proposal to our university to study how to set up such a framework. Of course we would like to learn more about the application of Internet in learning in other insitutes, and in particular in the area of information litteracy; for instance the European DEDICATE project looks interesting (Levy and Fjällbrant 1999). I can only hope now that we will be able to report on this in the future.

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IATUL

IMPROVING OPPORTUNITIES FOR RESEARCH

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The academic library environment in Finland

The academic libraries have traditionally formed the backbone of the national information provision in Finland. There are 20 university libraries and some 30 polytechnics with rapidly developing library and information services. The academic libraries have ensured that the scientific literature acquired to the country have been accessible to all. Until recently this meant that the academic libraries were open to the public, the collections could be used by anybody and the ILL services supplied the documents not found in own collections. Today the site licence policies of the publishers of electronic resources do not necessarily acknowledge this liberal user policy and hence the information provision towards the industry and other research institutions is of concern. Providing the users with timely scientific information is not, however, only a question of licensing but it is also a matter of applying the agreements in practice, product marketing and technical troubleshooting.

Research funding

Research funding as a whole in Finland has increased consistently in recent years compared with the modest level in the early 1980s. There was, of course, a slight decrease during the recession in the beginning of the 1990´s. Currently the research funding forms some 3 % of GDP which is among the highest figures within the OECD. The increased public funding, generated mainly from the privatization of publicly owned business such as the Finnish Telecom, has been directed selectively to promote the work of the national innovation system for the benefit of the economy, employment and the business sector. The funding has been channelled primarily into technological research through Tekes (Technological Development Centre) and basic research through the universities and the Academy of Finland [1]. At the Helsinki University of Technology all this has meant that the amount of research funding has risen by 150 % in the past ten years and forms today some 50 % of the total funding of the university.

Support to libraries through research funding

The growth in research funding has not been directly evident in the library budgets. A recent study in fact concluded that the Finnish university libraries never really recovered from the budget cuts made during the recession [2]. But the government decision to raise the level of research funding has fostered benefits to libraries in the form of the national electronic library for science and research. The initiative was first outlined in 1997 and it was to become no physical entity but an integrated networked resource and service arrangement [3]. Today the National Electronic Library, the FinELib, is a programme launched by the Ministry of Education with an annual budget of about 18 million FIM (some 3 million USD) and employing a staff of 2,5 FTE persons. The FinELib is a consortia consisting of the Finnish universities and the recently established polytechnics together with a growing number of other research institute libraries. The main partners of the consortia are the university libraries and the funding support to the programme is aimed to cover the universities share of the licence fees. Other participants of the consortia together with the public libraries (which may also join the consortia) are expected to get funding from their respective government departments´ sources.

The FinELib programme

The FinELib [4] is a centralised approach to joint acquisition of electronic information resources. The key issues have been agreed by all members of the consortia after which the negotiations and other operations can be carried out in a very flexible manner. When formulating FinELib principles it was regarded vital to commit the universities in the joint acquisitions from the start and at the same time to allow them with a reasonable transition period to change from print collections to the electronic era. It has also been important to provide the universities and their libraries with a sense of continuity in the FinELib support. It is expected to take several years before the transition phase is over and therefore it is necessary to support the expensive period before the print subscriptions are cancelled, provided that the archiving issues of the electronic versions are solved. The FinELib consortiums are built upon each agreement and it is up to each university library to decide whether to join a specific consortium. The consortia aim to make 2-3 year long agreements with the publishers and vendors. The information resources are classified as multidisciplinary or "subject specific" resources. In table 1 there is a description of the FinELib funding principles concerning these resource categories. The multidisciplinary resources are supported with 100% contribution during the initial agreement period and the support will be substantial (80%) in the second period as well. The subject specific resources require, however, a 50% contribution from the universities from the start in order to get the 50% centralised FinELib funding. The FinELib consortium may also enter other consortiums. The Finnish Technological Universities e.g. joined the Nordic IEL Consortium as a FinELib consortium and hence were eligible for the centralised contribution by FinELib. The FinELib steering group is responsible for the consortial decision making. In the steering group there are members from university libraries and universities, the Ministry of Education, polytechnic libraries, the Academy of Finland and the Center for Scientific Computing. There are also a number of subject-oriented working groups which are responsible for the selection of resources to be included in the FinELib funded resources. Through the working groups every member of the consortia has a possibility to have their voices heard and put their proposals forward. Today at the campus of the Helsinki University of Technology more than two thousand (relevant) journal titles in fulltext (PDF or HTML) as well as some 20 reference databases are available on all workstations via the FinELib and other licences. These electronic resources require quite an input in marketing, too, but now when the critical mass has been achieved it is easier to approach the users. There are some fields, however, such as architecture where the electronic journals still lack the most important part: the images. But evidently the digitised photographs and pictures will eventually be there, too. Table 1. The funding principles of the FinELib Consortium 1998-2002

RESOURCE TYPE	Pricing is based on either the number of potential users or the cost of printed subscriptions at each library	Pricing is based on a basic fee and an additional fee depending the number of simultaneous users
MULTIDISCIPLINARY MATERIAL	FinELib funding contribution: 1st agreement 100% following agreements 80% Universities: 1st agreement 0% following agreement 20 %	FinELib funding contribution: The basic fee Universities: Licence fee based on the number of simultaneous users
SUBJECT SPECIFIC MATERIAL	FinELib funding contribution: From the start 50% Universities: From the start 50%	FinELib funding contribution: The basic fee Universities: Licence fee based on the number of simultaneous users

The FinElib will fund development projects as well. One of the key issues will be the design of a joint interface to all electronic resources in the National Electronic Library. In this respect the similar initiatives currently in progress in the Nordic countries are in the interest of FinELib. Other development projects are dealing with linguistic technology, standards, guides and guidelines concerning digital and electronic libraries and user authentication methods.

The future of the National Electronic Library
The FinELib programme will be reviewed at the end of this year. The future funding prospects of the programme depend a great deal from the achieved actual usage level of the acquired products as well as from feedback collected from the researchers themselves. From the libraries point of view the FinELib programme has been a success and the positive attitude in campus towards the new resources has lifted also the library´s profile. Most probably the programme will receive further funding from the Ministry of Education for the next phase, at least until 2002.

The Ministry of Education is currently reviewing and revising its strategies for education and research and the recently approved government policy will support the initiative to establish Finland´s Virtual University. It is therefore expected that the trend of government support towards networked learning and research will continue even if the current level of research funding in general may only be sustained and not increased during the newly elected government [5].

Network and information security
Network and information security is becoming more and more important also in the academic circles. The reasons for this are many: the increasing amount of externally funded research carried out at universities calls for tighter data protection, the increasing use of the network also increases misuse and other unwanted actions, the electronic commerce requires more data privacy etc. The confidential co-operation between site administrators and libraries is essential when information accessibility or usability coincides with information security. In this respect the IP-filtering used for authentication is a two-edged sword: on the one hand it offers an easy-to-manage access for libraries and the campus users but on the other hand the complex firewall configurations may also unintentionally prohibit users from accessing valuable information sources. A hand-built firewall which has been configured on an ad-hoc basis may soon prove to be a pitfall [6], [7]. The Finnish universities have traditionally been quite liberal in their IT policy and have allowed their faculties and institutions to develop each their own local infrastructure. This has lead to a very heterogeneous IT environment as a whole. It is therefore difficult to implement at least comparable if not unified security measures across the campus and minimise the risks of conflict between accessibility and security issues. The technical issues in consortia agreements will no doubt be in focus more in the coming years and in this respect the recently published Guidelines for Technical Issues in Request for Proposal Requirements and Contract Negotiations (Jan 1999) by International Coalition of Library Consortia (ICOLC) are a good example [8].

Current challenges
The FinELib consortium model accepts also research institutions as partners provided that they are able to finance the acquisitions themselves. The centralised funding of the Ministry of Education applies to universities and polytechnics only. Until now only a handful of FinELib licences cover non-university research institutions. The various research institutes are supervised by a number of Ministries and therefore it has been difficult to establish a joint licensing policy among these institutions.

From the library user's point of view only the patrons physically on campus are rather well-off at the moment in terms of the desktop delivery of information resources to the workstations. The remote use is also made possible with the off-campus password options and the calling series provided by the computing centre. The library's reading room services, however, must be totally re-organized once the printed versions of journals no longer exist in the library. Another issue which needs to be solved is the ILL and document delivery service offered towards the Finnish industry and public administration. Some publishers, such as Academic Press and IEEE, have now allowed limited test service of ILL to the license holders for non-commercial customers.

Another challenge for the library is maintaining the balance between information accessibility and information security. In the near future the workstations reserved for the library patrons will be password protected. In order to use the electronic library resources the user must therefore first register himself. This will be a new concept to the traditionally so very open Finnish academic libraries where browsing and local use of the collections has been free for all and only borrowing required registration and a library card. It won't, however, take long before the patron´s may use one single identification and authentication in all his business with the governmental institutions. A citizen identification card initiated by Finnish Council of Ministers will be implemented and brought into use by the end of 1999. The card will serve as a means of a person's electronic identification and digital signature [9]. There is yet another aspect in keeping the balance between information accessibility and security. The HUT Library is itself an information producer and as such it grants licences to other institutions concerning the use of the TENTTU Web Service. This role of a "publisher" helps the library to understand the other side of the coin as well.

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The author agrees with the IATUL publishing policy

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IATUL

AHEAD OF THE GAME:
DEVELOPING ACADEMIC LIBRARY STAFF FOR THE 21ST CENTURY

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For those of us working in libraries and information centres the job is, to a degree not suspected by those outside the profession, about people. Libraries are full of people's voices, libraries are about people's concerns and beliefs and lives. A library is an investment in humanity, in its progress and its struggles and its traditions. I and my colleagues are involved with students who are busy turning information into the kind of knowledge and skills which will inform the rest of their lives; we also assist senior scholars striving to extend the boundaries of their discipline and add to the sum of human knowledge. Debate, discussion, argument, disagreement, the hunger for knowledge, the hope or anxiety for the future, the search for objective truth and the construction of individual perspectives - all these human dramas take place in the library every day.

The title of my paper refers to people, but most particularly to the people who are a key *resource* of the library - the library staff themselves. These human resources, as they are often referred to now in management terminology, are the people without whose skills information would not be discovered nor gathered together nor made widely accessible and intelligible - without whom the library would become chaos. Library directors recognise this, as do the communities for which they provide a service, which is why a little over half my budget is spent on staff. For a British academic library this proportion of total spend going on staff is quite typical - the national average for university libraries is just under 50%.

So we can say that we are investing a lot on staff salaries every year. But we are also investing in people's careers, in the personal development of individuals. We are employing people who (at one extreme) may be with us as trainees for as little as a year but who will be the future of the profession, while at the other end of the spectrum are staff who may have been with us for twenty or thirty years and who need to continue to develop as effective librarians in a period of great changes.

These changes are social, economic and technological, and there are some local variations. Thus in British higher education we have had to manage an expansion in student numbers, with a greater number of mature, part-time and distance students. This we have done with decreasing funding from government, at a time of the availability of more information in more various electronic formats. These have been my challenges - summarised in the phrase *more with less*.

Other changes are global, for example the doubling of scientific knowledge every ten years, of computing power every eighteen months, of the Internet every year. This is the situation we have in mind in Britain when we talk about the hybrid library, which is an evolutionary stage we're all reaching, a mixture of the traditional and the new in skills and media. Print culture is still very much alive and we have to use a familiar blend of professional techniques to sustain this. At the same time, the building blocks of the electronic library - the virtual library - begin to fall into place and we have to make decisions about the balance of traditional and new services.

What does this mean for library staff? It means that we still need our full range of librarian skills, but that we are also resembling more our colleagues in the computer unit and our colleagues in academic departments. We need an ever-growing IT expertise. We are taking on an increasing role in training our users, indeed teaching core modules in information skills. We have to undertake research, to establish the best way of doing things as well as the degree of satisfaction with which our services are received by our users. We have to raise money through consultancy or the organisation of seminars. We are becoming expert in electronic licences, in creating World Wide Web pages, in negotiating digitisation rights with commercial publishers. We are becoming more explicitly managers of information rather than custodians of books, with emphasis on the word "manager".

Library directors therefore need a vision of the future and a mental model of the type of organisation which can ride, rather than be swamped by, change, helping colleagues develop the cast of mind which turns daily experience into a learning process. Here the organisational culture can make a crucial difference.

So when I'm sometimes asked how I can justify, in a busy and under-resourced operation, the costs of training, I repeat the saying: "If you think training is expensive, try the alternative". The alternative is the hidden cost of inadequate or non-existent training programmes - dwindling competence, dismal morale, high staff turnover, absenteeism, avoidable accidents, complaints, information that is wrong or incomplete or too late in arriving.

Building a learning organisation for the 21st century begins in the perception of the importance of training I've just described, leading to a commitment from the top of the organisation downwards to the importance of training. Next comes a training budget which of course is never as large as could be wished but which allows a reasonably continuous flow of activity. Sometimes in larger organisations such as a university there is also a staff training unit which puts on free courses for all staff, some of which (e.g. time management or stress management) may be of general relevance to library staff.

Much good training can also be delivered inside the library, and numerous British university libraries now set aside one hour per week as a training hour. This time may be dedicated to professional areas such as aspects of online information or some general account of the way in which the university is developing and how this is affecting library objectives, an understanding of the context in which their work takes place being very important to people. Over the year, systematic programmes can be planned and then acted upon; lengthier, more concentrated events take place in and around university vacations.

In Britain there is also a constant stream of professional training events and conferences organised by professional bodies. Exeter staff who gain permission to go on these will be required to write up a report distributed to colleagues by email.

In British universities, in addition, all staff are now subject to review meetings – usually annual - with their managers, appraising the effectiveness of the work they are doing and agreeing the training required to maintain or improve their standard of work. Thus the library director has a map of training needs, allowing for more focused planning. Learning in the most formal sense, for qualifications, is also enabled at all levels, in terms of financial support, release of time and coaching.

This is the structure. The question remains, is the training effective and does it really address the basic goals of the organisation? I'd like to talk about an experience of my own at the University of Exeter.

In 1991 in Britain a new government-introduced award called Investors in People, essentially "a *national quality standard for effective investment* in the training and development of people to *achieve business goals*", was introduced. In 1995 I was persuaded, along with colleagues in the University of Exeter's IT Services and Staff Development Unit - all the academic services - to try to qualify for the award, which no

British academic library had then attained. The attraction to me was the chance for an objective external assessment by consultants from a business background of whether we measured up to the requirements of a true learning organisation.

The method of assessment involved a lot of documentation, some of which was developed for the process for example, individual training records and training application forms which required a statement of expected benefits. Comprehensive portfolios of evidence were gradually prepared, both generic (the University) and individual (each service). We started looking quite good on paper.

But anyone can look good on paper, so an anonymous questionnaire was administered to all staff; a representative sample of staff was also chosen by the external assessor and then interviewed by him over 2 days, sometimes singly, sometimes in pairs, sometimes mixing representation of the services. The interviews lasted 20-30 minutes and it was stressed that it was the organisation, not the individual, which was being scrutinised; all remarks were anonymous so that comments about training structures, morale and management style could be made without fear.

The principles of assessment were four, each breaking down into a number of indicators, each of which in turn needed to be satisfied to earn the award. And we had to prove, through paperwork confirmed by interview, that we were doing what we said. This was challenging. We had to demonstrate:

1. ***Commitment***
   - The commitment from top management to train and develop employees is communicated effectively through the organisation
   - Employees at all levels are aware of the broad aims or vision of the organisation
   - The organisation has considered what employees at all levels will contribute to the success of the organisation, and has communicated this effectively to them
   - Where representative structures exist, management communicates with employee representatives a vision of where the organisation is going and the contribution employees (and their representatives) will make to its success
2. ***Planning***
   - A written but flexible plan sets out the organisation's goals and targets
   - A written plan identifies the organisation's training and development needs, and specifies what action will be taken to meet these needs
   - Training and development needs are regularly reviewed against goals and targets at the organisation, team and individual level
   - A written plan identifies the resources that will be used to meet training and development needs
   - Responsibility for training and developing employees is clearly identified and understood throughout the organisation
3. ***Action***
   - All new employees are introduced effectively to the organisation and all employees new to a job are given the training and development they need to do that job
   - Managers are actively involved in supporting employees to meet their needs
   - All employees are made aware of the training and development opportunities open to them
   - All employees are encouraged to help identify and meet their job-related training and development needs
   - Action takes place to meet the training and development needs of individuals, teams and the organisation
4. ***Evaluation***
   - The organisation evaluates the impact of training and development actions on knowledge, skills, performance and achievement of goals and targets

- Top management understands the broad costs and benefits of developing people
- Action takes place to implement improvements to training and development identified as a result of evaluation
- Top management's continuing commitment to training and developing employees is demonstrated to all employees

So the road, from commitment to evaluation, is an increasingly hard one, definition of indicators which show the operational benefits your training is having being most difficult of all. The process is also cyclic: evaluation feeds back into planning and action.

Investors in People judgement came by written report and a debriefing session with the assessor, who made it clear that there were one or two cloudy areas but that the positive attitude of staff had carried a deal of weight. We were gratified to hear of the commitment of all staff and their high estimate of current morale, especially given the University of Exeter's restructuring which would shrink budgets by around 9% over the next three years. The morale reading seemed higher than elsewhere on campus, while positive remarks about the directors boosted our own morale.

Beyond this, the exercise focused minds at all levels on the problem of professional skills and knowledge, provided a framework for analysis and action, encouraged better measurement methods for performance improvement, demonstrated the value put on staff effort by management and offered a snapshot of morale, communications, perspectives at all levels. All of which moved us down the road towards an ultimate goal - becoming the kind of organisation where learning is habitual and where, crucially, people are empowered to invest in themselves as the hybrid library goes through its changes.

A later assessment of organisational culture carried out within the whole university probed questions of morale, relationships with managers and individual development. This institutional cultural assessment proceeded through anonymous questionnaires, responses to which build into four different pictures (organisational, personal, management style, communications) based on different bundlings of nine discrete factors (identification, equity, equality, consensus, commitment, rationality, development, group dynamics, internalisation) in an organisation as experienced by employees.

The overall results showed the levels of anxiety and confusion you would expect from a traditional organisation thrown into flux, forced into restructuring and facing the unpredictabilities of change. It was possible however to plot the survey results against Investors in People processes, showing the responses of staff in the library and other services which had gained the award to be more positive than the rest of the university, and indeed above the average for all organisations which have used this cultural assessment methodology. The feeling of being assisted with relevant training and encouraged to take individual responsibility for development came across strongly. The total survey interpretation is a complex one, but seems to suggest that we are better placed than other segments of the institution to face future challenges.

Having spoken of training everyone else, finally, what about me? A Library director is allowed to think about his or her own development from time to time, even if (or especially because) the job seems to be more and more about developing others. But how do you learn what a director does, and how do you go on learning? My own experience, which is not untypical, has seen a variety of challenges and huge changes in the business of information, through which I have gradually assumed more and more responsibility for my own learning while moving to levels where fewer and fewer formal learning situations are available.

There is certainly the necessity to develop in oneself and one's colleagues the cast of mind which consciously turns daily experience into a learning process. This should be career-long. Indeed, learning the skills necessary to lead an organisation has for me been largely the result of workplace experience, in two categories.

Being thrown in at the deep end is a rather brutal learning environment but also a very urgent incentive to learn. "With insufficient preparation, with little warning, you are propelled into the swimming pool out of your depth and have to improvise and learn very quickly. It is not perhaps meant to be as random or Darwinian as it seems, since the managers who push you in at the deep end have usually seen a potential they think will "cope with the challenge". At times in my working life I have found myself struggling to stay afloat while a voice rings in my ears telling me that I should see it as a compliment. And many of these challenges have involved learning to lead. " (1)

Next to Nellie is a phrase we use in Britain for the most basic way of learning a new job, a new skill. "Sit the employee next to someone who does the job or has the skill, a person supposedly always called Nellie, and by some magic a transfer of knowledge takes place, though not always a very sound transfer of knowledge; this still has a place in organisations, though ideally as part of a whole panoply of training and developmental opportunities." (2) I have been lucky enough to sit next to some very good teachers in my career, including chief librarians and deputy librarians. Indeed, it is enlightened to see coaching and mentoring as key to the process of building a learning organisation, and look for some of our greatest successes in the career progress of colleagues, even if this means that the best leave to become directors themselves.

Beyond that, if the director's job is leadership, then such a person has much to learn from other kinds of director, in business and industry. Some library high fliers have looked for a degree in business administration to give them a framework of generic skills. Less formally, it pays dividends every so often to step aside and attend courses not aimed specifically at library and information workers. The translations into one's own context involve effort but the insights are often what is needed to unlock creativity.

British library organisations such as SCONUL (Standing Conference of National and University Libraries) have also been increasingly aware of the lack of professional training focused on becoming, or being, a director. This has led to a number of initiatives, notably in running seminars and intensive courses for potential leaders. Subsequently, a large number on these have reached top positions. They have done so because the working lives of directors in British libraries are getting shorter, 5-10% of chief librarian posts becoming vacant each year (out of a hundred or so British universities). A large element of succession training, deliberate or otherwise, is evidently underway – and perhaps the realisation that the ultimate leadership skill is knowing when to stop!

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IATUL

USER EDUCATION IN HIGHER EDUCATION: HELPING ACADEMICS JOIN THE LEARNING ENVIRONMENT

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My view of academic librarianship is based on ten years of experience at the Institute of Education, which is a postgraduate college of the University of London. The Institute has a very high reputation as a research organisation, but academics are currently rather more exercised by the concepts of teaching and learning. As teacher trainers they are aware that their own learning and teaching strategy should be an exemplar for other organisations. In this paper I will examine some of the issues that concern me in relation to how lecturers themselves approach learning.

At the Institute of Education Library, as in most institutions, user education focuses on the needs of students, in our case postgraduate students following courses in teacher training as well as Masters and Doctoral students. We pride ourselves on our understanding of the library skills needed by these students and feedback from them, and from their teachers, suggests that we are successful. But we continue to feel concerned about the apparent failure of researchers and lecturers to gain the same levels of library expertise as their students. We know that this is the experience of other academic librarians in other Higher Education Institutions and we are tempted to believe that it is the academics who are failing rather than the librarians. Why is it that so many academic staff use the library as little as possible and then embarrass themselves with their lack of expertise? Why do they resort to the sort of tactics which would label students as failures?

My searches through the literature have shown me some unexpected answers to my questions, which should not have come as a surprise since in my experience academics write very little about libraries and librarians just write very little. The first thing that I discovered was that not much has been written about academic lecturers as learners. There is a great deal of interest in how students learn, but also an assumption that teaching and learning is a one way process, that is teachers teach & students learn and their roles are never reversed. Professional development for teachers seems to consist almost entirely of learning how to teach and using libraries does not seem to be part of the curriculum. In the UK the Institute for Learning and Teaching will accredit teaching qualifications for lecturers in Higher Education, as recommended by the Dearing Report [1]. Librarians should be working to ensure that library skills will be included in the course. My own experience of teaching new academics on courses at the Institute of Education is that many new lecturers see little point in learning how to use libraries. It is useful to examine some of the reasons for this apparent disinterest, which is shared by many experienced teachers.

A major area of concern for all our users is the inaccessibility of information to those without the necessary IT skills. We are probably all still dealing with a minority of students who fail to grasp the need for IT skills and we are aware of the inequality of opportunities to learn for those who have no access to IT equipment or training. IT skills are a much bigger issue for academics who find it difficult to see themselves in the role of learner. But the failure of academics to learn how to use computers should be seen in the same light as their 'failure' to learn how to use libraries. May it not be simply that they don't need these skills as much as we librarians suppose they should.

We need to pose some questions about why people use libraries. In an academic context we must suppose that students use them to find and read key texts for their studies, but these texts are increasingly available as study packs, sometimes in electronic form. For the most part students will use libraries to extend their knowledge of areas which particularly interest them and to research a topic for a dissertation or thesis. Invariably their tutor will provide them with some initial references, but after that they are on their own and the various databases accessible via the library are crucial to their research. It may be presumed that academic research and teaching will take this process further and that libraries will be crucial to their discovery of every possible source of information. A number of recent pieces of research have shown that academics do not work in this way and that they pay lip service to libraries, feel guilt about not using them, but still find traditional methods of information gathering more effective and much easier. Research carried out by Christine Barry and David Squires at Kings College, University of London [2], showed that despite intensive training and support in the use of databases and other IT systems, researchers in Education and in Science were equally still convinced that other methods worked better. Barry and Squires conclude that "academics only learn and use the IT-assisted information systems where they perceive themselves as having a need that can be met by that system" [3]. The 'Invisible College' of conferences, discussions over coffee and phone calls to colleagues has been joined by e-mail as the most effective ways of keeping up with the field, because of course the 'field' for an academic is very much narrower than the field for an undergraduate.

I've read all this and understood it but still felt a conviction that academics could do even better research if only they used all those wonderful resources which we librarians have gathered together and made available for them. I wanted this conference paper to include some proof about my theories; I felt sure someone must have written something scholarly and clever which I could quote in this paper, so I set out to make use of my library skills.

My starting point was a paper by Christine Barry which I had come across on a web site on 30th January 1997 (I know the date because fortunately I had printed it out). When I tried to access it again it had vanished but I did manage to find further references to Christine Barry and to the Information Access Project at Kings College. I made use of citation indexes and other electronic databases. I managed to persuade a librarian at University College London to let me use Library and Information Science Abstracts (LISA) on CD-ROM (because of course just when I wanted to do my research staff at the British Library were on strike) and while I was in the library at University College I browsed their shelves for other material. Realising that the browsing had been more effective than the database searching I browsed our own shelves of library literature at the Institute of Education. And while I did all this I felt more and more frustrated by my inability to find what I wanted, which may or may not be there. So I went off to a conference of Education Librarians and we spent two days talking about the role of the librarian in supporting research. Celia Coates, Librarian at Nottingham Trent University, talked to us on the conference theme and referred to an article in a journal and I sat there and thought about why I hadn't browsed the journals because I had assumed that the indexes I'd searched would have provided any relevant references, but of course I'd missed this one. Finally Professor Mo Griffiths of Nottingham Trent University talked about what academics wanted from librarians and she confessed that her research for the paper had been done by sending one e-mail to a number of colleagues. The results were much more interesting than all my searching.

Mo Griffiths' respondents complained of just the problems I'd come across when I tried to access appropriate literature for my research. The library I really needed to use was closed. The databases I used weren't up to date so I had to look at recent updates in paper format; one of the databases was on CD-ROM with an interface which I hadn't used for some time so I had to spend time working out how to use it; it was extremely difficult to come up with explicit enough key words to reduce the number of irrelevant results; and when I did find something I then realised the computer I was using didn't have a printer. Very few of the references I discovered were immediately available, and Interlibrary loans was slower than I expected. The list could go on; and all my complaints are echoed in the responses from academics to Mo Griffiths enquiries.

So does this all mean that academics have got it right and librarians are deluding themselves? I don't think so. I think there are lessons for all of us. Librarians have to try harder to understand what our users really need, even when they don't know themselves. We should continue to support the needs of students, including acknowledging the information seeking skills available beyond the library. And we should look for ways to encourage and empower our academic colleagues. The idea that lecturers should teach library skills seems impractical. Librarianship is a profession; those of us who practice it have years of training and experience behind us; why do we imagine that academic colleagues should add these skills to their own considerable expertise when they seldom need or use them? What we need is a shared understanding. In a stimulating and thought provoking paper on the self-explanatory library, Philip Pacey [4] suggested that the reason librarians have failed to teach library skills to academic teachers is that they might then be more successful at teaching students than we are. While I agree with him wholeheartedly that library systems often stand in the way of easy access to information, I think we must acknowledge that the needs of academics and students are not the same.

The Fielden Report [5] referred to academic convergence as a goal, a belief echoed by the Follet Report [6] and elaborated by Mike Heery and Steve Morgan as 'academic integration' [7]. I'm pleased to note that my literature search uncovered an earlier reference to this approach in a paper by Schmidmaier to the Third IATUL Online User Education Seminar in 1986 [8]. Unfortunately these views are more easily shared by librarians than by academics whose first loyalty, as Duke [9] points out, is to their subject rather than to their institution or their students. What we need to do is encourage academics to understand the library needs of their students and get involved in rethinking not just teaching and learning strategies but the curriculum itself. The current emphasis in the UK on subject review and quality in teaching provides librarians with an opportunity to share their beliefs with academic colleagues.

We all know that Knossos wasn't built in a day, but we can start in small and sometimes subtle ways. At my Institution academics often join their students for library induction sessions in an environment where they feel safe enough to admit they are learning too. Social events, meetings, involvement in the Academic Board are all ways of getting to know my colleagues. I also make it known that I see myself as a teacher as well as a librarian. Perhaps more importantly I see myself as a learner. In all the literature about lifelong learning and the learning society there appears to be very little mention of teachers as learners. I believe that the sharing of ideas must be a two way process, but I am aware that teachers work for the most part as individuals and librarians have a responsibility to share our more collegial working ethos. Above all, if we enjoy our work and talk to academic colleagues with enthusiasm, at least some of them will begin to want to know more about what we do and why we do it.

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USER STUDIES, LIBRARY RESPONSE: PROVIDING IMPROVED INSTRUCTIONAL SERVICES

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Relatively diminishing financial resources and increasing user expectations are combining to create a new emphasis for the traditional research library. Although collection development continues as a major factor in the life of such libraries, user services are being increasing emphasized as the academic world incorporates more and more in the way of management techniques from the business world. Many libraries have been affected by the changing business management styles that have come into vogue in the last twenty years. This paper reports on the development of a pilot project engaged in the combination of evaluation and cognitive and skills assessment of users to provide for effective strategic planning for library instruction at a large research library.

Assessment and Evaluation - An Attempt at Definition

Whether the changes from the traditional bureaucratic model of dependence upon a professional elite to extreme responsiveness to user needs is beneficial for the institution is the topic for another study. Here, we will explore the relationship between evaluation and assessment to determine how both the institution and the user can benefit. Evaluation and assessment work together to provide a basis for planning, but in many ways they are at opposite ends of the user spectrum. In this instance, the word evaluation will be directed toward a normative process. Evaluation is a judgment call. When evaluation is done in the library, it is most commonly done on the basis of one individual's opinion and as the word stem would indicate, values play a large part in the process. Assessment on the other hand implies a more empirical approach to a question. This is not to say that assessment is value free. Indeed, if we are to believe our postmodern philosophers, even the most empirical test is not free from some type of normative process. The results of studies can certainly be affected by the manner in which results are read. The manner by which the test was created, the sample taken, and the means used to compile information can also play a large part in the normative structuring of the empirical study. For our purposes, however, the implication is that general agreement has been reached by several people or institutions concerning what will be assessed and how it will be assessed. At least enough consensus has been achieved to validate the assessment on the part of a majority of those who might form the knowledgeable elite.

Recent History - The Growth of the Importance of Assessment

The increasing importance of assessment is underlined in higher education by the way in which regional accrediting agencies in the United States have been approaching the reaccreditation process. There are six agencies in the country that routinely visit colleges and universities in their geographic region and provide an avenue for credentialing the institutions as meeting certain standards of operation. The accreditation process is purely voluntary, but very important to the well-being of most institutions of higher learning in the United States. Through agencies such as the North Central Association of Colleges and Schools, higher education seeks to set standards of quality while at all times seeking improvement in the programs provided to students. In the past, these accrediting agencies were primarily concerned with evidence in the areas of governance and administration, finance, admissions standards and the provision of student services, institutional resources such as the number of books and types of services provided by libraries, student academic achievement, institutional effectiveness, and the relationships between the institution and its outside constituencies. The college or university was charged with writing a self-study, covering certain specific factors that the agency determined as essential to a good program. Within the past decade, the emphasis of the North Central Association has changed from focusing on institutional assets to focusing on outcomes assessment. To see an overview of the criteria go to http://www.ncacihe.org/overview/ovcriteria.cfm. The result of this change in emphasis by the accrediting agencies has been change on the part of many administrations in the way budgets are meted out to the distinct parts of institutional operations. Assessment and evaluation within individual departments or areas of operations are becoming more commonplace as a result of this movement.

A Case in Point

The changing emphasis mentioned above, plus the migration to a new catalog interface for the University greatly increased the awareness of user needs, attitudes, and abilities for many of the librarians working at the University of Illinois at Urbana-Champaign (UIUC). The University supports the largest publicly funded academic library in the United States. It recently celebrated the acquisition of its nine millionth volume. The Library is a member of several consortia, many of which are dedicated to resource sharing. Physically the Library is made up of over 40 departmental units, each with a great deal of autonomy. The catalog of the University has been automated since the mid-1970s. In August of 1998 the interface was changed with a view to migrating to a web interface in the not-too-distant future. The database, however, has never been completely retro-converted, with the records for most items purchased prior to 1976 accessible through author or title search only. Forty-five other academic libraries in the state combine with UIUC to create a union catalog called Illinet Online which provides statewide accessibility to over thirteen million items through patron initiated requests. The Illinois Library Computer System Office, or ILCSO, oversees the provision of this service statewide. The state has a model inter-library loan system that is multi-type in nature, reaching all levels from the school library to the special library, to the college and university library. The University is also a member of a consortium referred to as the Big Ten. This consortium, usually viewed as the basis for competitive sporting events, reaches beyond the arena and the court in the form of the Consortium for Institutional Cooperation or CIC. The CIC consists of the (eleven!) Big Ten Universities, the University of Chicago and the University of Illinois at Chicago. As the CIC name implies, cooperation extends into many areas including that of library resources. The result of the CIC's dedication to resource sharing is a Z39.50 based cooperative catalog called the CIC-VEL which also allows the patron to self-initiate requests for materials. The University also subscribes to the services of FirstSearch and in this manner provides access to the WorldCat bibliographic database, the web interface for users of the OCLC system. The result - patrons should be able to obtain whatever materials they wish, but they need to learn to work with three online catalogs. In addition, the University offers its users over seventy online databases, and uncounted CD-ROM databases. This embarrassment of riches combined with the decentralization of services frequently causes more problems than it solves for our users.

The UIUC Library does not have a strong tradition in the dedication of resources to library use instruction. The decentralized nature of the system combined with the large numbers of incoming freshmen results in very few students being reached in a standard manner. Most instruction for the past five years had been delivered in the hit or miss manner of the course-integrated fifty minute session or generally voluntary attendance at a Library sponsored workshop. There was no budgetary commitment from the administration to library use instruction in most areas. The development of a Web-based tutorial, financed through grant funds, was meant to provide instruction to the 36,000 students enrolled at the University, at least until the new interface came on line.

The University Librarian appointed a Task Force on User Education at the beginning of the 1997-98 academic year. This task force was charged with the "design and implementation of steps for a plan to orient/instruct users of the University Library." [1] The plan was to involve both formal and informal orientation and instruction in several media. Longer term consideration for training and orientation of all classes of users - undergraduate, graduate, faculty and staff were recommended for consideration. The University Librarian agreed to support the presentation of Web-based workshops on the use of article databases in the spring of 1998 with the hope that the skills learned there would be transferable to the new catalog interface.

A large deficit for the Library had caused the cancellation of a large number of important science journals during the 1997/98 academic year. Swift and negative faculty reaction lead to the creation of a campus-wide "Task Force on the Future of the Library." After six weeks of intense study, several suggestions were made for the improvement of the Library's well-being, including an increased emphasis on user services. The Director of Collections and Assessment and the Head of Research and Planning for User Services joined to develop a survey to evaluate user attitudes toward the Library. This user survey disclosed some interesting findings. General attitudes toward the Library were, as expected, pretty positive. The area of greatest interest to the Task Force on User Education was the revelation that most individuals assessed themselves as very capable when it came to using the Library, giving themselves a "mean self-score of 3.72 of a possible 5" in their ability to find things in the library [2]. Even more amazing was the way in which they wished to learn - 45.5% on their own, 41.2% through web pages and online, and 38.5% through individual instruction. [3] In the open ended questioning at the end of the survey, only 8% of respondents indicate they would like to see the library "Teach people to use the library, and advertise this service."[4]

Jill Fatzer summed up the problem quite succinctly in her article on evaluation for the Library Literacy column in RQ over a decade ago. We need to look at the whole picture if we are going to do an effective job of evaluation. We need to look at the "affective, cognitive, and psychomotor areas." Fatzer further maintained that "these three domains closely parallel the traditional three aspects of competence: attitudes, knowledge, and skills." [5] In the recent past, the greatest emphasis in user surveys has been on evaluation, the first of these three domains, at the expense of the second two areas of competence. Perhaps the lack of tools such as those available through the World Wide Web, or perhaps a lack of enthusiasm for instruction, or perhaps a lack of confidence in our own knowledge has discouraged us. Whatever the reason, the time of inaction on our part must be put in the past. It is in fact imperative that we treat our students in the same manner as the biologist or engineer. We must dedicate ourselves to help them learn to be information literate, and unless we know the initial depth of knowledge of our users, we cannot assist with the learning process. With the development of World Wide Web tools that provide a great deal more interactivity, we should be able to easily and completely explore all three domains with our users.

Users indicate a great deal of self-satisfaction with the manner in which they are accessing information at the library. They see little need for formal instruction, and frequently resent its imposition upon them. The question that occurs to us is this: Do they really know what they are doing? Can library users be successfully self-taught? Ultimately, we need to know what our students understand before we can structure a program to help them learn more about the library. Where do we begin? That is the question this pilot project on assessment seeks to answer.

Methodology

The first task was to determine what should be tested for. What are the competencies of the expert, or adequate library user needs to successfully navigate the sea of information we present to them? We are provided with a great deal of assistance here. The American Library Association has been developing the concept of information literacy through its National Information Literacy Initiative or NILI. Essentially, this program seeks to educate librarians in the delivery of information literacy skills, and to define the criteria by which the information literate may be judged. [6] In addition, many colleges and universities define their own criteria for information literacy. There are some truly wonderful sites on the World Wide Web that can be used to develop a competency framework that suits the individual institution. [7] We have based the assessment questions in our survey on a variety of the suggestions found in these resources as well as a general reading of the Big Six Skills articulated by Michael Eisenberg. [8]

Our survey was divided into three distinct areas. First, users were asked to identify their relationship - frequently of use, type of use, etc. - with the library. They were also asked how they learned about the library and its use - self-taught, through a friend, through a reference desk worker, at a workshop, through the tutorial. The second part of the survey contained assessment questions which attempted to ascertain whether the individual knew how to articulate the problem, read a citation, the difference between an index and a catalog, information concerning primary, secondary, or tertiary sources, Boolean operators, keyword vs. subject searching, etc. Finally, some questions specific to the University's system were asked - what is the Gateway, can you search by subject in our catalog, where can I find the Social Sciences Abstracts, Dissertation Abstracts, or Poole's Index? All three sections will be treated as distinct parts of the study, but it is unlikely that the users will live up to their own expectations in general research, and even less likely in the navigation of the complex Library system at UIUC.

The survey is initially being administered to a relatively small sample of students, all members of political science courses. This initial part of the project has required that we use paper surveys. If results indicate it should be continued, it will be mounted on the Web next year and extended across the education and social science disciplines of psychology, anthropology, political science, sociology, social work, speech communication and education. If this proves effective, it will be adjusted for audience type and extended across the disciplines to include the sciences and humanities. At this writing, results of the pilot survey are incomplete. From the results of the administration of a similar assessment tool to undergraduates at a small liberal arts college done from 1992-1995 however, it is unlikely that the general student population will score the 3.72 out of 5 that they had assumed they would. [9]

Conclusion

Our next step is fairly clear. The results of the Task Force on the Future of the Library and a changed budgetary process at the University required that strategic planning be done. One result of the new strategic plan for the library was the recommendation that the position of Instruction Coordinator be developed and funded in the near future. Along with this position comes support staff and a real budget for the implementation of a library-wide program. It is our sincere hope that the assessment we are doing now can be expanded across the curriculum and will help guide us to the areas in which instruction is most needed. Thus with the combined outreach of evaluation and assessment for our patrons we will both know what they want and need. Some areas of weakness can be addressed by information presented in workshops, some on the web, some might require the one-on-one venue of the reference desk. The delivery of instruction needs to be as varied as the types of learning styles. With increasing familiarity, the user might also feel more empowered to request changes that librarians have not considered, thus improving the services we render even further. User surveys alone are not enough, we need to continue and expand our attempts at user testing to provide a true picture of our surroundings. The user assessment and the user evaluation can, and must be combined. Schlichter and Pemberton do an excellent job of exploring the pitfalls of user studies as evaluative tools. [10] The addition of the user assessment will go a long way to eradicate the inherent problems in a strictly normative study. In the future, we might want to include the teaching faculty as another source of input concerning what truly is needed in the way of providing the best possible service to all of our publics. We then need to take our results into full account when doing the strategic planning we are all so involved in within our modern organizations.

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  - the University of Hawaii at Manoa at http://nic2.hawaii.edu/~emailref/libinstr/libcomp.htm;
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...or any number of other excellent sites.

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Initialisms and Abbreviations

ALA - American Library Association

CIC - Consortium for Institutional Cooperation

CIC-VEL - Consortium for Institutional Cooperation-Virtual Electronic Catalog

ILSCO - Illinois Library Services Computer Office

NILI - National Information Literacy Initiative

UIUC - University of Illinois at Urbana-Champaign

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IATUL

THE CHANGING ROLE OF THE LIBRARY: MISSIONS AND ETHICS

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I recognise that the theme of your conference - the changing role of the library - focuses on academic libraries and the changes that will stem from the changes in educational structures and organisations, and in new approaches to teaching and learning. Given that national libraries play a significant role in the educational systems of their countries, these changes will also impact on them. However what I should like to do in the time allotted to me this morning is to describe some of the broader questions of mission and ethics that the British Library has recently been addressing. The British Library experience is I believe of relevance to all national libraries, and much of it to academic libraries.

National Libraries depend upon the general public for their very existence. All of them survive to a very great extent on the tax payer. In the face of huge competing pressure on government funding, particularly for education and health, national libraries will only flourish if they have political support, and that political support will only be forthcoming if there is a general recognition that national libraries make a significant contribution to national life.

The British Library is going through an exciting yet critical period in its development. Exciting because next month we see the completion of our move into the new British Library building at St Pancras. Critical because we have felt it important now to undertake a very thorough and fundamental review of all of the Library's activities. In essence, asking what a British Library of the future is for, who it should serve, and how it should serve them. One of the answers we must provide is how we balance our services to other libraries, to scholarship, research and innovation with those to the general public. Who should pay for these services? The user, the taxpayer or should the activity be funded from some other source? Is the Library seeking, or seen to be elitist, serving a relatively small group of scholars and researchers, or does it have a wider purpose?

For the last 10 years the Library had described itself in its strapline as 'the world's greatest resource for research, scholarship and innovation' - no mention there of the general public; and yet alongside its services to the research community, industry and academia it always had a modest wider public access programme. I shall turn to this later.

It supports research by collecting and maintaining the national archive, by ensuring the provision of the national bibliography, by building up its collections of research materials from all over the world, and by providing access to its collections through reading rooms and interlending and document delivery services.

There is certainly nothing elitist about the national archive. Much of it comprises low level fiction, newspapers, leisure journals, popular music and so on. Certainly these will be valuable materials for researchers both now and in the future. But in itself the collection is not elitist and contains much that is of interest and value to the general public, be it for matters of family history or recreational use. There is, I believe, support from the public for the idea of a national archive, something which helps embody the history and culture of the nation and which in itself is an expression of nationhood.

But who uses this collection? The British Library has long recognised that for the most part it cannot act as a 'super public Library' open to all. It would be simply overwhelmed were it to try to do so. It must look to the academic, government, commercial and public library systems to provide the front line support for the vast majority of users and use. The British Library has therefore developed a policy of admitting to its Reading Rooms only those who have a recognised need to use the national collection, a need which cannot be met by other means. Again, this is not in itself an elitist approach The Library is, as I said, open to all who need to use it and furthermore to do so in the reading rooms free of charge. However it is clear in practice that the majority of people who do use the reading rooms are researchers and scholars of one kind or another. Nevertheless a significant proportion are what might be called 'the public' use the library not for professional purposes but in pursuit of their own personal interest.

Similarly the users of the interlibrary loan and document supply services are predominately from academic and industrial institutions but again a significant number are from public libraries and of these it must be assumed that some of the use is for private rather for professional or commercial reasons.

Thus some hundreds of thousands of the general public are using the Library each year, yet this remains a very very tiny fraction of the total population.

So how can we touch the lives of a greater part of the population? In one sense the new St Pancras building itself has made a great impact. First, as the largest and most expensive public building put up in Britain this century, it is a very prominent statement of the government's commitment to the national library. Furthermore despite the criticism of its architectural style it has become, since opening, recognised as one of the most outstanding recent examples of British architecture. It has become a landmark for the capital and a national building of which every citizen can be proud. More importantly it provides the opportunity for greater numbers of the public to view and enjoy a much an enlarged exhibition space, to see the richness of the King's Library in its glass tower, to attend an ever increasing number of events - lectures, films, music, dance, readings - which are held there, or simply to have a cup of coffee or a meal and enjoy the architecture and the ambience. In the first year of opening some five hundred thousand people have visited the library for these various purposes. We expect this to grow to seven hundred and fifty thousand this year and to increase thereafter.

But it is not the building which provides the greatest opportunities for public access, it is that other great public space - the internet. Technology is and will be the key to making the Library relevant to more people. Use of the Library's website is growing enormously. Over 40 million hits a year and over 10,000 searches a day on the OPAC. A high proportion of this usage comes from our traditional communities but general public use is growing. Already many more people have seen the digital images of Beowulf on the web than have ever seen the originals in our exhibition cases.

So far what I have said all seems very easy. We continue to serve our core scholarly and research community and at the same time expand our outreach. So why did I say earlier that we were at a critical stage of the British Library's development?

The British Library, like other national libraries, has some underlying characteristics which make it ever more difficult to continue to fulfil its traditional role, or which mean that if it is to continue unchanged, then it will require much greater financial resource. I will mention just three simple drivers. First the task of taking in under legal deposit the output of the nation's publishers. In the UK this has been growing consistently at some 5% per annum for several years. Each 'free' book costs money to process, catalogue and store and, in due course preserve. Second, price inflation for scholarly books and journals - a phenomenum with which every library is having to grapple, but for a national library, because of the size of its requirement brings in absolute terms huge financial pressures. And third, the ever-increasing size of our collection (national libraries do not have much freedom to dispose of material) and the associated cost of housing that material and preserving it. These factors, and some others, mean that if the Library is to continue in the way it has done in the past then some extra £20 million per annum would be required in three years time, on top of the £80 million we currently receive as grant-in-aid. It is unlikely that any government would be able to countenance such unending increases and, whilst the UK government, has promised extra support it falls below the level we regard as necessary.

Income & Expenditure 1997/98 (£ms)	**Total Expenditure**	**Sales & Donation Income**	**Government Grant**
Collection-related activities			
Acquisition cost of new items added to the collection	11.9	0.7	11.2
Other Collection Development & Collection Management Costs	34.3	0.2	34.1
Services to end-users			
Reading room services	11.8	1.0	10.8
Remote document supply	26.6	24.2	2.4
Reference & Information Services	8.3	1.0	7.3
Wider Public Access			
Exhibitions, Events/Education, Publications, Bookshop	5.7	2.6	3.1
Services to the UK library network			
Bibliographic Services	3.0	1.9	1.1
Research & Development	5.9	2.5	3.4
Leadership, Partnership and Co-operation	3.5	0.9	2.5
TOTALS	**111.0**	**35.1**	**75.9**
Footnote: Totals exclude Library income of £0.1m and expenditure of £10.4m on its St Pancras project in 1997/98 and miscellaneous items of expenditure totalling £0.9m (and offset by income of £0.9m) not attributable to the activities in the table above			

It was against this background that last year the Library embarked upon a major strategic review which was informed by a substantial consultation exercise with all its stakeholders.

Within this review the Library's Board felt that it could not ignore, given its financial difficulties, the question of charging for access to the reading rooms. Depending on the level and method of charging the Library estimated that it could raise £3-6 million per annum by these means. Sums sufficiently large not to be discounted lightly. There are perfectly respectable economic and ethical arguments that can be advanced for charging for access, but given the national and international impact of any decision in this area the Board thought it right to include this as one of the many questions in the consultation exercise.

The results of this review were that the highest priority for the Library should be placed on:

- the continued development and centrality of the collection
- the preservation of the new library's collection
- the inclusion and integration of digital materials
- improved access through reading room services
- no charging of readers for access to reading rooms
- improved access through remote document supply services
- improved access through web based services
- continuing effects to achieve still greater efficiency savings and income generation
- much greater collaboration with other libraries on collecting, access and preservation.

Significantly most of our stakeholders suggested that the priority for grant-in-aid funding should go to core services serving scholars rather than to wider public access. And yet one key stakeholder - the government - has a policy of supporting wider access, a policy of social inclusion, of life long learning, and of creating digital content which can support wider access through networked public libraries, university libraries, and other learning centres for which it is giving financial support.

Thus there is a seeming dilemma - on the one hand we are asked to give highest priority by many of our stakeholders to what might be described as elitist services yet on the other hand the government, our greatest financial supporter, has a very clear policy of social inclusion. The answer of course lies in alternative sources of funding, but this cannot be the complete answer. Some activities, eg publishing and the book shop can be self supporting and indeed profit making without compromising their purpose. Exhibitions can and do attract sponsorship but our experience suggests that even the most generous sponsorship (and we have had several examples of this) will not meet the full cost. We have therefore concluded that we must maintain a modest level of grant-in-aid funding for our wider public access programme and see its expansion and development based on attracting increasing sponsorship and other revenue earning activities.

But as I said earlier the greatest outreach will stem from the development of web-based services supported by an ever growing mass of digital content some of which will itself be developed through sponsorship, some from the use of grant-in-aid, some from working with the private sector and much, we hope, through legal deposit.

As a national library we believe that our mission of ensuring the collection and maintenance of the national archive remains, a review reinforced by the consultation exercise.

If we are to continue to fulfil this mission we believe it essential that the UK's legal deposit law - which currently applies only to print-on-paper - be extended to include the deposit of non-print publications. For the past three years we have therefore been working with publishers to develop a proposal which could go to Government with the backing of both UK publishers and the UK legal deposit libraries. The principle of legal deposit is one that is accepted by publishers - much of the discussion has been about the access that the libraries can give to the deposited materials during their term in copyright (this in itself is an interesting ethical question - how far should the commercial interests of the publisher be affected for the public good that comes through legal deposit?).

I am glad to say that an agreed proposal was put to the Government last year and the Government has accepted the principle that the legal deposit laws should be extended and has committed itself to introducing such legislation at some future date. Meantime, in advance of a mandatory system, publishers and the legal deposit libraries are working together to introduce a voluntary scheme later this year.

However, we are all learning that providing services from digital materials does not come cheap.

If the British Library is to collect and preserve non-print publications (the preservation aspects bring huge challenges), and to provide access to them in a coherent way in the Reading Rooms; and to collect or provide access to digital content originating outside the UK; and to digitize important printed holdings for the benefit of a wider audience - then the costs of providing the appropriate infrastructure and services will be very significant, and unlikely to be affordable from the Library's normal running costs.

Against this background the Library decided some two years ago to seek partnerships with the private sector to develop its digital library infrastructure and services. In so doing it had to address a number of legal, economic and ethical issues. How far should a public body go in ceding control of some of its operations to the private sector in return for private sector money? I will mention three important decisions that we took:

1. The Library must always control its acquisitions policy.
2. The Library must control its pricing and service policies for its statutory and other public good services.
3. It could surrender control of its value-added services.

In the event, after a good deal of effort, the Library and its preferred private sector partners were unable to conclude a deal and amicably disengaged from the process. The reasons why a deal couldn't be struck centred around the Library's public good responsibilities and the private sectors commercial imperatives. The whole process has however been helpful for the Library in raising awareness of the issue with Government and subsequently engaging their support in seeking further public sector funding for this important initiative.

In this presentation I have sought to show how the British Library has addressed some key questions about its mission and some ethical questions that have been posed along the way.

To sum up I would say that the basic, traditional mission of the Library has been validated and seen as enduring. But there are greater opportunities and calls for it to reach a wider audience, be they life-long learners or simply the interested public. It has had to address the ethical, political and practical questions of who pays for what services, and how far the private sector can play a role in funding and operating them.

I am sure that you all face similar challenges and I hope that this brief outline of how the British Library has addressed them will contribute to the aims of your conference.

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LEADING LIFE-LONG LEARNING: THE LIBRARY'S ROLE

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Overview

Libraries operate within the service industry and increasingly are seeing marketing as a focus for ensuring that the services they provide are useful and appropriate. In a marketing context, users become customers; the services provided are products developed to meet customer needs; a price is involved in an exchange process (although it may not have a monetary value); the place in or from which the services are provided is part of the process; and promotional strategies are used to ensure services provided are understood and valued by the customers. To take on an effective role in the support of learning, libraries need to understand their customers, the learners. They need to know how people learn and how the provision of information and information resources contributes to learning. Customer needs must then be translated into services through a thorough understanding of the changing socio-cultural, economic and educational environment. Some of the experiences at the University of Queensland Library in meeting the challenge of creating an appropriate library and information service to support effective learning are outlined in this paper. The changing customer base and the changing higher education and library environments are described and four service strategies developed are referred to. These are the design of new facilities, the introduction of interactive information skills programs, the development of the University of Queensland Cybrary and a schools project.

Who are our customers?

In the Australian context, eighteen to twenty two year old high school graduates from middle class families no longer dominate today's undergraduate student body. There are increasing numbers of adults from diverse backgrounds, already in the workplace, many with families, many with very little formal education and many from different countries and cultures. These changes in the undergraduate and postgraduate student population are expected to continue as work environments continue to change rapidly. School-leavers now comprise just under 50% of the student population. The new generation of students exercises choice in selecting the higher education institution in which to enroll, is more focussed in choosing which course or combination of courses to study, and opts for a variety of study modes - part-time, full-time, distance mode, weekend mode or a mixture of modes. Many prefer flexible learning modes which do not require a physical presence on campus (1). Lifelong learning is the aim of many. Some are entering new careers. Others are seeking stimulation in what is an early retirement. Younger students too have varying aspirations for their studies at University and different approaches to learning

Understanding the changing customer base

Three years ago, the University of Queensland Library engaged a market research firm to explore the attitudes of students towards the Library as part of their attitudes towards various services provided by the University (2). Focus group discussions were held and the results showed that students regard themselves as important and deserving. They are self-centred and see University education as a right. In Australia, tertiary education is "free" although students pay HECS (Higher Education Contribution Scheme) which varies in cost according to the disciplinary program studied. Students may pay HECS up-front at a discounted rate or at the end of their studies when it is deducted from their wages once a certain minimum annual salary is earned. The HECS leads students to believe that they are paying for their education, even though this constitutes a minor part of the costs involved. The students believe themselves to be poor (although much of the socio-economic data of the student population would deny this) and are passive in their approach to the University, unlike their activist colleagues of some years ago. Nevertheless, there is an underlying anger beneath this passivity.

The study showed that the student view of all services at the University is coloured by the student emphasis on academic progress. They relate primarily to the teaching departments or faculties and not to the services provided by others. They have little understanding of the varying types of University services available and do not really wish to gain detailed knowledge of them. There are (not unexpectedly) marked differences between male and female students. The females are more focussed on the end result and are good at finding help. Males tend to be more idealistic and see the need to seek help as a sign of weakness. The results further showed that the students are from a "now" generation. They regard the University as a wealthy "special place" of excellence. Most students appeared to be unconcerned about passing or failing, but wish to fine-tune their results to attain a higher level pass which will reap the final reward of an interesting well paid job. While at University, they want to gain a general understanding of life and training in how to think as well as some specific area of knowledge or expertise. Inherent in their expectations is that the University will somehow make it all come out right for the student. The Library is perceived as the only essential service (outside of the teaching) at the University because of its direct link to academic progress.

The student perspective on the Library

The market research focussed on the Library as well as the general view of the University as a whole. Students see the Library as a University icon. They see it is a strong contributor to the University of Queensland image. They see the Library as a symbol of the old-fashioned heritage values of University life. On the whole, students are satisfied with Library services. They see the Library as a haven within an alien world. They consider the training courses provided to be excellent and the problems they perceived relate to communication about new services and the availability of up-to-date materials. They understand the period of change in which the Library is involved and see the Library as central to help in use of information technology and improving their own learning skills. While most of the findings were expected, not all Library planning at that stage had focussed on the needs revealed and the information has proved invaluable in determining the future of information service delivery to students at the University.

In 1997, The University of Queensland Library engaged a market research consultant to conduct further focus groups with library users to assist on this occasion in the development of an ideal approach to the restructuring of its web pages (3). The incremental growth of the home page and its associated content had led to an array of ill-assorted data. The web site had been designed from the library perspective rather than a client's and was internally, rather than externally defined. The focus group findings were again invaluable in determining future directions. Specifically, the focus group research was intended to:

- determine the existing client needs in relation to the library web site
- obtain client reaction to the model under construction
- explore a number of existing library web pages to determine patterns of usage and reaction to layout.

The results of the research revealed that most people know only a little about the Library, and that few will ever acquire an in-depth knowledge. Their approaches to the Library web site are task-oriented and frequently crisis-driven. Many users lack computer skills, Internet skills and information seeking skills. For these clients, the Library is a source of frustration. Most students approach the Library in search of reference material for assignments, theses and papers. Hence, their primary need is direct access to the catalogue and database network. Whether experienced or inexperienced, they are interested in learning how to search more effectively. They need details about the Library including the hours of operation, borrowing rules, the location of library branches and facilities available in each branch. Undergraduate students particularly are interested in access to examination papers.

The market research also found that the student's level of experience and degree of confidence impact on the ability of people to explore a web site. Experienced users are more likely than inexperienced ones to use search engines. Experienced users agreed a good web site is one that is updated regularly. In summary, students want speed of access, instant comprehension of link words for efficient browsing, the ability to navigate/explore the site, help with searching, information on University courses and what they regard as essential information on the Library.

The changing higher education environment

The 1990s have presented many challenges for universities in terms of increased costs, ever-changing information technology that continues to become more sophisticated, a changing student population, new pedagogic directions and a new role for the university in lifelong learning. Universities in dealing with these changes have reviewed their operations, revised their activities and reinvented themselves, creating new opportunities.

Globalisation is a trend throughout society and universities too have become globalised. The move towards a knowledge-based society in a rapidly changing education market place is driving universities to prepare their students for lives and careers in the Information Age (4). Professional organisations and employees have been voicing for some time their concerns about the types and levels of skills and knowledge required by graduates. They have used their mandate to influence the university curriculum by way of accreditation and employment of graduates and funding for universities. Numerous reports on graduate outcomes emphasise the importance of critical thinking, problem solving and effective communication skills.

The 1996 review of engineering education in Australia "Changing the Culture: Engineering Education into the Future" (5) in discussing the changing focus of engineering education, states that:

> *"The focus of engineering education will be on creating lifelong learners, from early education, through undergraduate education to continuing professional education, and from generalist to technical specialist." "Engineering courses must have clearly stated goals and outcomes and equip graduates for lifelong learning".*

Emphasis on lifelong learning is not confined only to engineering education. Companies like Motorola, Boeing, British Aerospace and professional organisations for accountants, management and others have already begun establishing their own universities or partnering with existing universities to provide in-house degrees to their employees or members. In this context, educational programs are carefully tailored to meet the specific lifelong learning needs of particular groups of students. It appears that traditional universities have failed to produce satisfactory outcomes for some.

The new pedagogic paradigm emphasises the empowerment of students and encourages them to take control of their own learning. The student becomes a learner, the teacher becomes a coach; the teacher-centered university becomes a learner-centered educational environment; teaching is transformed into the design and management of learning experiences (6). The sage on the stage has become the guide on the side. This new learning environment for students has a significant impact on academic libraries. The library can play a central role in the transformation of the learning environment.

The changing Library environment

In transforming the learning environment, one goal of the library in the Information Age is to foster effective self-service among users and to create lifelong and self-directed learners(7). The Library is focussing on the creation of self-sufficient information literate customers. Just as the shift in education is moving from "just in case" education to "just in time" or "just for you" education, libraries must reorganise themselves for "just in time" and "just for you" service to their customers. Librarians must also reinvent themselves and become involved actively in teaching how to find, use and evaluate information as part of a lifelong learning continuum. Principles of information/knowledge management and the ability to access and exploit a variety of information resources to increase productivity are added values libraries provide to their customers.

The value libraries add to the life learning process must be demonstrated along with the competitive edge they provide to their parent organisations in terms of competition for more/better students. The difference the library makes to increase the impact of the brand their parent organisation is marketing needs to be articulated and communicated in a language that is clearly understood by the governing bodies.

The capacity of libraries to "make the difference" to the learning experience has on the one hand never been greater but on the other never been more constrained. The opportunities provided by new technologies are limitless but the high cost of providing library collections, including full-text electronic resources as well as print resources, which both escalate in price at a rate faster than consumer price indices; the cost and complexity of an appropriate information technology infrastructure; in the Australian context a low valuation of the dollar against other currencies; and the difficulty of obtaining funds to cope with the increased costs are integral, inescapable and limiting features of the changing environment for libraries.

The Library's response

What are the appropriate responses? The possibilities range from greater involvement of libraries in the planning, design and delivery of the curriculum for flexible learning, offering information skills training at a time and place and in a format that suits the customers, different types of physical space and facilities in the library for individuals and groups, highly personalised virtual services on the Web and easy to use, new access tools to exploit the new services and collections both on the Web and in the Library. These changes obviously have significant consequences on strategic and financial planning, facilities design, and the recruitment, training and deployment of staff.

How do we plan and provide *just in time* and *just for you* information service to large numbers of users who may live thousands of kilometers away or in the same city, but prefer to take courses in flexible delivery mode due to work, family or other commitments? A study on users' expectations at Duke University has re-enforced the findings of our own focus group work. High touch and high tech go hand in hand. The majority of users think a good information source is one that includes a librarian. Campbell (8) argues that "We must convincingly humanise the technological library". The challenge of including librarians in an increasingly dehumanised environment will involve a fresh and radical examination of our services, staff and operations as a whole.

Many libraries have already adopted numerous strategies in reinventing themselves. They are using benchmarking, TQM (Total Quality Management) and performance measurement approaches to improve service delivery. They are adopting flatter organisational structures with fewer layers of hierarchy to seek faster and more responsive action to deal with the customisation and personalisation that the new complex marketplace demands. They are using improved communication and promotional strategies to reach their customers.

Librarians are finding new ways of working with academics to ensure students learn how to learn. Libraries are forming partnerships with teaching staff, instructional designers and IT experts. Such partnerships may extend beyond the university, leading to collaboration with commercial organisations seeking continuing education for their employees, with schools wanting to introduce advanced skills and knowledge at an early stage and government organisations.

The University of Queensland Library
The University of Queensland Library is the largest library in Queensland. It contains 1.8 million volumes, 11,000 videos, 20,000 journal titles, 3000 electronic journals and extensive microform, multimedia, digital and primary source collections. Stretched end-to-end the collections would reach from Brisbane to the Gold Coast. Bigger does not necessarily mean better for students and the Library's very size can be confusing- finding one's way through the many resources to the few that are needed for a particular purpose has never been easy. The Library provides its services to students and to their teachers through thirteen branch libraries located at several campuses, St Lucia (in Brisbane, the capital of Queensland), Ipswich (a 30 minute drive from Brisbane) and Gatton (a one hour drive from Brisbane) campuses and in several teaching hospitals (located primarily in Brisbane) and in the Dental School (Brisbane CBD). Over 200 databases are networked and dial-up access is available to most of them.

The Library has designed its physical facilities around student needs. Surveys of students are regularly undertaken to ensure feedback and to assist in planning and design of services provided. Services to assist students range from one-on-one inquiry services to Internet training in classroom situations. The collections are housed in branch libraries, based on discipline and geography and in a warehouse on the St Lucia campus which provides cost-effective storage for less used material. Each branch library includes similar facilities and provides similar services, although there are some variations due to client need. While the services are designed for the benefit of students and staff of the University, these same services are appreciated by members of the wider community who regularly use the Library.

Many strategies have been used to extend the role of the Library in active support of teaching and learning at the University of Queensland. Four strategies are now described;

- facilities design
- interactive information skills programs
- *University of Queensland Cybrary*
- schools projects

Facilities design
Classical library design has focused on the physical collection, with careful calculations about current size and projected expansion. The Library has been seen as a "place" where materials are stored, readers are seated, and staff work, many behind the scenes processing materials. Service areas have also been provided, with circulation or loans desks, and information or reference desks. This approach to library design matched the traditional paradigm of the library. Scholars, or users, went to a physical place to gain access to recorded knowledge. They used bibliographic records and rows of shelves of printed materials. Librarians were guardians of their collections and assisted users find their way.

The traditional paradigm of the Library has gone but traditional approaches to library design have continued, with few changes in the appearance of libraries. Many still suffer from the "edifice" complex, are difficult to use, and lack functionality. New approaches to library design must focus on the client, accommodate the technology, provide for training of clients in information skills, be cost-effective, allow for printed collections which while shrinking in their expansion rates are still growing, accommodate staff whose primary activity is service to users, and support the social role the Library has always played. Thoughtful and innovative creation, maintenance and use, including the packaging, promotion and advertising, of effective virtual and physical facilities will do much to meet the customer needs already identified.

The University of Queensland Library undertook a major refurbishment project in 1997/98 to upgrade its Social Sciences and Humanities Library (which included an outmoded an undergraduate library). This is the largest branch on the St Lucia campus and serves 50% of the student population. The customer was the focus of the design. Initial ideas were developed and trialled in an upgrade of the Dorothy Hill Physical Sciences and Engineering Library. The physical layout and facilities of many service organisations, such as telephone sales, banks, airlines and shops were examined for inspiration and ideas. The refurbishment involved not just more computers, but computers in a range of different kinds of spaces, express workstations for quick look-up, email, self check-out machines, special study spaces for post-graduate students, computer rooms for training students to exploit various electronic resources, large discussion rooms with tables for groups of undergraduate students with access to workstations, photocopiers and networked printers, small discussion rooms for group work and single study rooms.

The signage in both the newly refurbished library and most other branch libraries was reviewed and redesigned with the assistance of the architect and a signage consultant. The colour, shape and the wording of signs were replicated in the print publications as well as design of the Library's home page. All workstations in the Library are equipped with the same kind of software and look the same to ensure that students find the same interface and same resources wherever they go. CJK script was installed on all computers for overseas students to access newspapers and other resources in their native languages.

In summary, the upgrade has provided cost effective services to customers, including academic staff, postgraduate and undergraduate students, and the associated research community; amalgamated formerly separate collections; ensured the most appropriate flow of people and the linking of services in relation to the way information is used; ensured flexibility in space design to accommodate future changes; provided for gateway services, and an Electronic Information Centre of approximately 100 computer workstations for word processing and other applications use as well as Internet use; groups of computers for accessing the electronic library; computer laboratories which can be used as training rooms for information skills programs; a conference room seating 100; an exhibition space; appropriate housing of the traditional printed collections for the foreseeable future, with separate controlled access for specific sub-collections; attractive display areas; a variety of seating including individual carrels, comfortable seating, and group discussion; a social meeting area/coffee shop; suitable provision for dial-up user access; appropriate accommodation and amenities for staff; and appropriate spaces and facilities for the use of postgraduate students and researchers.

Interactive Information Skills Programs

The University of Queensland Library uses a variety of information skills programs. Special programs for postgraduate students have been developed. Standard Internet classes are regularly provided. Lunchtime clinics are held. However, a particularly effective program has been developed for first year engineers. This program has evolved from a print-on-paper-based approach five years ago through an initial Web experiment three years ago to a fully fledged interactive program using WebCT. This program is an example of effective collaboration and partnership with the teaching staff and has provided the opportunity for innovative library services which facilitate flexible learning as well as lifelong learning. The program began as part of an initiative of the Dean of Engineering to revitalise the first year engineering program in response to the outcomes stated in the National Engineering Review discussed previously. The program was designed to use problem-based learning and a project approach to the studying of engineering. The subject is called *Introduction to Professional Engineering* and project topics change every year. In 1998, the topics were:

- Does Brisbane need a superstadium
- Small scale modular cogeneration units
- Business opportunity in biomaterials
- Grappling with garbage
- Energy systems for a remote mining town

The information skills component of the program is designed to assist and support students in the research for their projects. Specifically it seeks to ensure students acquire skills such as task definition, information seeking strategies, location, access, use and evaluation of information.

In 1998, a web-based instructional tool, WebCT was used to create the program which is interactive, has links to information resources available both in the Library and outside, includes a bulletin board, email and online chat facilities and assessment tools. Librarians designed the program for each project with input from the project coordinators. An instructional designer was consulted to make sure learning objectives were compatible with the design. Evaluation results from previous years as well as assistance from a past student were extensively used to further improve the content and design.

The exercises were made available on the Web for the students to enter their answers. All answers were marked automatically. A database of all possible answers was created. Students were able to go back and check their answers. The program is an assessable component of the entire subject. Students were able to do much of the work at home or wherever they had access to the Internet. The exercises on the Web constitute 8% of the overall assessment of the unit of study and the bibliography of the final project report constitutes 5%. The approach has proven to be extremely effective and evaluations from both staff and students have been extremely positive. Work has also begun on adding to the skills and knowledge developed through this program. Special information skills programs are provided for fourth year engineering projects.

University of Queensland Cybrary
The focus group findings on the Library's web pages led to the University of Queensland Cybrary (http://www.library.uq.edu.au/Cybrary.html). In building the Cybrary, the results of the student input were used. Essential items of communication were placed at the first level of the web pages as few students bother to develop an understanding of what is on offer throughout the site. Information categories were made as clear and concise as possible. Statements were designed to be immediately clear to the lowest level of user and details kept as brief as possible but not hopefully at the expense of understanding. Layout was standardised across all pages. Given the access speed required, non-essential graphics were avoided to reduce the time taken in downloading. Through the Cybrary, students begin with a single integrated web interface to all library collections and services, including library opening hours, staff contacts, branch library layouts and details of facilities and training programmes. From here, they can travel to the local catalogue of on-site holdings of books, journals, videos and other resources. They can access all types of electronic resources, or example, Australian Standards online. Occasionally textbooks are available in electronic form, for example Harrison's *Principles of Internal Medicine* or tools such as *Phase Equilibria Diagrams*. Students are able to view their own borrowing records and renew their loans.

To gain further knowledge from the journal literature, students can continue their voyage of discovery by searching over 200 databases indexing thousands of journals. Students can then find the printed journals on the shelves or use electronic versions. Some of these databases are linked to the electronic form of the journal itself, for example *MathSciNet*, IDEAL, IAC, ABI Inform and CSA. The Cybrary provides access to over 3,000 electronic journals. All are listed in the Library's web catalogue under title, and direct links made to them. The Cybrary provides access to course materials including lecture notes, reading lists with links to the catalogue for each book or journal on the list and past examination papers. The Cybrary's effectiveness was recognised last year with the award of an Australian University Institutional Teaching Award for Student Services.

Schools Programs
The need to build positive educational experiences for high school students led the Library to create the University of Queensland Library Cyberschool. Some initial ideas were gained from a presentation at the IATUL conference in Irvine, California, in 1997. The Cyberschool is a web *'place'* where Queensland high

school students can go to do research using state-of-the-art electronic databases and information tools.

The University of Queensland Library began work on the UQL Cyberschool early in 1998 with an initiative conceived in partnership with international database publisher, Information Access Company (IAC). The first step was a trial by three Brisbane schools of IAC's Expanded Academic ASAP database of 1500 indexed and full text journals. The trial was an overwhelming success, and led to the Library and IAC offering discount access to Expanded Academic ASAP to subscribing Queensland high schools from February 1999. The UQL Cyberschool is at http://www.library.uq.edu.au/schools/.

The Virtual School of Engineering (VSE) project is an extension of the Cybershool program which illustrates the involvement of the Library in lifelong learning, even before students come to the university. It comprises a series of engineering problems that offer participating students from high schools the opportunity to develop their research and problem solving skills through collaborative team work as well as self-paced learning. This project involves a web-based program to promote an understanding of the role of engineers in the community by creating an awareness of the important contribution that engineering makes to the standard of living in Australia. Librarians have been involved in creating the web-based projects in collaboration with teachers and engineers and providing information assistance to students in schools in both remote and local locations. The VSE is at http://webct.library.uq.edu.au:8900/SCRIPT/vse/scripts/serve_home.

Conclusion

The changes in higher education and libraries are both threats and opportunities. If libraries understand their external environment and the needs of their customers, they can maximise the effective use of resources, including funds, brand identity, staff, physical space and facilities, the Web, and their collections, both traditional and electronic, and thereby ensure that the contribution made by libraries to teaching and learning is truly effective. Libraries will be relevant, visible and credible in the new educational environment (9). Libraries must seek external sources for partnerships and innovative ideas to obtain and retain a competitive advantage. Libraries must promote, advertise and repackage their services to all their stakeholders, particularly to emerging types of student learners to ensure value to their stakeholders' and customers' needs and requirements. The new learning environment is here to stay, will libraries?

Abbreviations, acronyms and initials

CSA: Cambridge Scientific Abstracts
GMC: Graduate Medical Course
IAC: Information Access Company
IDEAL: Electronic journal collection from Academic Press
ITLO: Information Technology Liaison Officers
UQL: The University of Queensland Library
WebCT: A Web-based instructional tool designed at the University of British Colombia. It is a template with a range of facilities that course designers can use to prepare and present courses. It includes bulletin board, online chat, student web page creation, email, and assessment facilities.

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IATUL

INTERNATIONAL LIBRARY, INFORMATION AND ANALYTICAL CENTER (ILIAC) AS A NEW FORM OF INTERNATIONAL COOPERATION FOR LIBRARIES AND UNIVERSITIES

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Introduction

It is my pleasure to introduce the most recent project of Russian National Public Library for Science and Technology. This is not a project any more. ILIAC has evolved from an idea of a group of enthusiasts to the corporation operating in Washington, DC. ILIAC representative offices are planned to be opened in other developed countries. The Library I represent is ILIAC founder and one of major incorporators.

International Library, Information, and Analytical Center (ILIAC) is a non-profit US-based and US registered corporation of international status set up with the goal to contribute to the development of library, information and, in general, educational, scientific, cultural and business cooperation between Russia and CIS countries, and the USA and other countries. !LIAC is incorporated by Russian and American legal bodies of various status.

ILIAC goal is to introduce a system of permanent representation and support of scientific, cultural and educational interests of CIS countries, which are ILIAC partners, in the United States and other foreign countries.

ILIAC major tasks are:

- Development of international information East-West business;
- Promotion of Russian sci-tech and library products, educational services, business proposals and cultural exchanges;
- Library interaction and cooperation; establishment of specialized libraries of CIS countries in the United States and other countries;
- Information service and document supply for American and other foreign users;
- Consulting services and cultural, scientific and educational study tours, business contacts with foreign partners;
- Support of compatriots, cooperation with diaspora, and others interested in cooperation with Russia and the CIS countries.

ILIAC was registered on May 16, 1997 in Washington, DC, USA as a non-profit 501 (c) (3) American corporation of international status. ILIAC's three principal governing and contributing bodies are: the Board of Directors, Advisory Council, and the Group of Visitors which include representatives of scientific, public and business communities of Russia, USA, and CIS counties. ILIAC Headquarters is located in Washington, DC at 1776 Massachusetts Avenue, NW, Suite 700. The premises are provided by the American Councils for International Education: ACTR/ACCELS, one of the ILIAC incorporators.

The main Russian office is open in Moscow on the premises of Russian National Public Library for Science and Technology (12 Kuznetsky most, 103919, Moscow, Russia). Rapid development of the network of ILIAC representative offices is envisaged.

ILIAC operates within programs and projects. **ILIAC basic programs** are:

- Library program;
- Scientific, technological and social information exchange program;
- Educational program;
- Business information program;
- Consulting program;
- Telecommunications program;
- Ecological program.

ILIAC major projects are:

- Russian, Ukrainian, and Belarus Libraries in America;
- Moscow Project;
- Crimean Project;
- Information and Library Resources of Russia and CIS countries;
- American and Foreign Universities for Russian Students;
- Children on the Internet;
- Internet Bulletin on Russian Legislative Resources;
- Russian Scholars and Engineers Abroad: Electronic Encyclopaedia;
- International School on Librarianship, Information Technologies, and Cultural Studies;
- Regular Professional Tours "Librarianship, Information Systems, and Education in the United States";
- Annual Conferences "Russian and CIS Electronic Resources: Full Current Survey and Forecasts";
- Chernobyl Accident and Its Consequences: Bibliographic Survey and Document Supply.

One of the most recent projects is the project **"Russian Library in America"**. The Library was opened at ILIAC Headquarters in Washington, DC in March 1999. Its concept and goal is the establishment of a specialized library holdings Russian regional publications; development of cultural cooperation between the USA and Russia; introduction of American people to the national cultural and historical heritage of Russia; support of cultural and scientific contacts; orders for local libraries and publishing houses.

RLA collection profile is as follows:

- Regional legislation;
- Area studies;
- Sightseeing;
- Reference, statistical, phone books;
- Regional historical and cultural heritage of regions;
- Regional and local press;
- Other regional publications.

RLA offers following services to its users:

- Reading room;
- Document delivery;
- Internet-server;

- Round tables;
- Discussion clubs.

International School on Librarianship, Information Technologies and Cultural Studies (ISLITCS) is the most recent project within ILIAC educational program. The School is founded by ILIAC and Moscow University for Culture. **The School objectives** are:

- various academic programs and courses for foreign professionals specializing in Russian and Slavic studies:
- professors' and specialists' qualifications improvement in the fields of related programs;
- running bachelor and master programs in library and information sciences, cultural studies (for Russian citizens on the first stage);

The ISLITCS activities are:

- Academic process organization;
- Development of instructional materials and programs;
- International exchange of instructional materials, organization of professional conferences, round tables and workshops.

The ISLITCS suggested academic programs are as follows:

- Professional tours to Russian libraries for foreign librarians;
- Multi-profile academic program on library and information technologies in Russia;
- Special academic programs in library and information sciences (cataloging, collection preservation, classification, new information technologies in libraries, archives, museums, library management and marketing in Russia, others).
- Russian language intensive study program;
- Programs on Russian literature, culture, folk arts.

ISLITCS alumni of any program will be awarded with international certificates validated by Russian and western universities. ILIAC provides all required facilities for running of these programs. The training center at ILIAC-Moscow is fully equipped and has a direct access to Internet.

Conclusions - ILIAC perspectives

For more information on ILIAC programs and projects please visit ILIAC Web site. As you can see, ILIAC has already done a lot and is supposed to be done more in the futureWe plan to open ILIAC representative offices in several West European, East European and CIS countries. This will promote the engagement of a great number of professionals into ILIAC programs and projects, which we look forward to. The list of ILIAC partners is open and for participation and contacts for mutual benefit.

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IATUL

THE ROLE OF LIBRARIES IN A CHANGING ACADEMIC ENVIRONMENT

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The history of higher education (Ancient History)

The idea that education is something which people should pursue, even into their adult years, is not new. It extends well into the distant past. Every society has individuals who fulfill specialized roles, and some of these require an extended education. Sometimes these people are known as shamans, priests or teachers, and sometimes they are university professors, doctors, architects, or artists. In all of these examples, a form of education beyond the elementary is necessary. It may take the form of an apprenticeship, or intense private study or contemplation, or it may take the form of a formal higher education. Whatever the form, the purpose is the same: to perpetuate knowledge, and to extend it.

The idea of knowledge has been a part of every culture on Earth. However, almost every person alive has a different notion of what is useful knowledge and what useful knowledge should be passed on to younger people. What knowledge is worth preserving, extending, perpetuating, what knowledge is useless, even harmful? The history of higher education is essentially a history of choices, made on the basis of cultural imperative, politics, religion, need and precedent.

The knowledge accumulated by a culture is essentially bound to that culture, and seems to ebb with it. For instance, the knowledge of philosophy and natural science accumulated by the ancient Greeks seemed to crumble with their civilization, though it was later recovered in part, by various successive cultures. The technical expertise in road building, waste management and civic planning which the Roman civilization introduced, seems to have been lost when the empire collapsed, causing not only the loss of skills, but also a great deal of human suffering.

Knowledge is so closely connected to the culture from which it originates because it is transmitted through education, and education is essentially a cultural institution. Every civilization and culture has its own ideas of education.

Every civilization asks these questions:

- What should be taught and who should decide what should be taught?
- Who should teach it?
- What should not be taught?
- How long should education last?
- Who should be educated?
- What is the purpose of higher education?

These questions are as much a source of controversy now, as they were 5000 years ago. Our own notions of education, especially higher education, are grounded in Ancient Greece.

Back in the Old Days...

The Greek civilization began around the 6th century B.C. Learning and scholarships were intrinsic to the cultural make up of the ancient Greek World. Some of the names of Greek scholars are still well known today. Pythagoras, for instance, the mathematician who invented irrational numbers, lived in the ancient Greek world. He was born in 532 B.C. Euclid, known for his contribution to geometry (Euclidian geometry) was born in 300 B.C. Democritus, not so well known, lived in Greece in the 3rd century B.C. He was the first scholar that we know of to suggest an atomic theory of matter.

The most easily recognized names from this era are the names of the great philosophers: Aristotle, Plato, Socrates, etc. These people were the originators of modern Western scientific and philosophical thought. They also shaped western pedagogy, that is, the way we teach. They introduced a new way of dealing with problems. Socrates, though he personally did not write anything, which has survived, to modern times, was immortalized by Plato. He was an innovative pedagogue (teacher), who taught through a dialogic interaction with his students. In other words, he asked questions and they answered until they realized that they were wrong and he was right. Plato, his student and admirer, adopted the Socratic method and transcribed a series of "dialogues" which featured Socrates as a teacher and various young men as students.

The Academy

Plato was so impressed with the Socratic method of research and teaching, that he set up the Academy in 387 B.C., to perpetuate the method and direction of scholarship introduced by Socrates. It is commonly recognized as the **First University**, or **school of higher education**, in the history of the Western world. The Academy was actually quite informal by modern standards. It was just an area, set aside in the center of Athens, where students and masters could interact freely, discussing issues in the fields of philosophy and mathematics.

Aristotle was one of Plato's students and admirers. He came to the Academy in 387 B.C., and stayed for twenty years. He left when Plato died and traveled around the ancient Greek world, setting up similar institutions as he went. He was interested in a broad range of knowledge, including empirical science and anatomy as well as philosophy. He was the first to set standards for systematic scientific research, and **his ideas are the basis of modern scientific method**. Aristotle is also acknowledged as the founder of Logic, as a method of discourse and research, and as a field of inquiry. His other contribution to modern scholarship is the idea of dividing knowledge into separate fields, each with its own methodology and subject matter. In 335 B.C., Aristotle opened the Lyceum in Athens. This was the world's first polytechnic, devoted entirely to scientific research and training.

At the end of the Greek era, then, the **idea of upper education** was centered on the interactive dialogue between a teacher and student. **Questions and answers were at the very core of the education process**, as well as a way of directing research and systematizing it.

Ancient Greek Knowledge - How it Got to Us

The Greek civilization eventually lost its integrity and dominance in the Mediterranean area. With the loss of political power, it seemed that the vast body of knowledge, which the Greeks had amassed, would also be lost. So how did the ideas of Aristotle, Plato and Socrates filter down to us? **How did their concept of higher education come to have such strong and abiding effect on our modern institutions?** How did their culture attain an almost sacred status within our own? How is it that after two and a half millennia, we still feel compelled to imitate their architecture in our own institutions of higher learning, seats of government and law courts?

For one thing, the civilizations, which co-existed with the Greeks and sometimes even engaged in political and military conflict with them, did not fail to see the value and unique quality of their intellectual achievement.

The Romans, who conquered the Greeks, adopted the Greek curriculum for basic education. They moulded and altered it to suit their needs, but left the basic fabric of it intact. The Romans had a more utilitarian approach to education than the Greeks, but they still stressed the disciplines which became the Liberal Arts. They felt that anyone who aspired to succeed in business or public life needed to be able to express himself effectively (women were not educated in anything beyond the scope of their future domestic duties), with style and eloquence. So, the Greek disciplines of grammar, rhetoric and dialectic - especially the first two - were considered indispensable to a young man's education. They used the Greek rules of debate to construct their legal system. To this day, Roman Law exists as a paradigm for much modern legal procedure. The Romans also modelled their arts and plays on the styles the Greeks had developed.

Alexandria, the last stronghold of Greek civilization and scholarship, was conquered by the Muslims in 642 A.C. The Arabs absorbed the amassed Greek knowledge, and proceeded to translate and interpret what they found at the **great library at Alexandria**. The translation and transliteration process was greatly sped up when, in 751 A.C., the Arabs took Chinese prisoners at the war of Samarkand, and **learnt to make paper** from them. **This meant that more people had access to books, so more people could be educated. It also meant that education was something that could take place everywhere**. The old manuscripts were made of vellum (animal skins) and didn't travel very well. The introduction of paper books meant that written materials were lighter and smaller and that education could become decentralized.

The Arabs set up universities, or schools of higher learning throughout their territory: in northern Africa at Nizamiyah and Mustansiriyah (in Baghdad), and in Spain at Cordoba, Seville, Toledo, Granada, Murcia, Almeria, Valencia and Cadiz. The schools were bound closely with the Muslim faith which, unlike early Christianity, embraced scholarship and learning and encouraged it for the greater glory of Allah. The early Arab universities taught vocational, professional and purely theoretical subjects. These included: algebra, trigonometry, geometry, physics, chemistry (in its early, alchemical manifestation) astronomy, medicine, logic, ethics, metaphysics, grammar, prosody (the study of poetic structures), law, jurisprudence and theology (Encyclopedia Britannica) They pursued active and systematical research in the areas of medicine, pharmacology, agriculture and pure sciences. The Arabs had assimilated knowledge from all the cultures they had been in contact with, whether by trade, military conflict or conquest. Thus the body of knowledge available to them included elements of the Zoroastrian culture of ancient Syria, Indian science and belief, Greek science and philosophy, as well as Chinese learning. All the Arab universities had reference libraries containing the translated works of all of these cultures.

During the early part of the second millenium, the Arabs were slowly expelled from Europe. The schools and libraries they had established fell into the hands of European Christians, who immediately set about translating the works of the Greeks, Indians and Arabs into Latin. Much of what we know about the writings of the ancient Greeks comes to us through this source. This was the basis of what is known as the 12th Century Renaissance, and set off a major revolution in scholarship and learning in Medieval Europe.

The First Universities

During the years of Medieval, in Europe, the first universities were being formed. **The first of the great medieval universities was established in 1088 at Bologna**. This school specialized in teaching Roman Law, which is the paradigm for all modern western codes of law. **In 1119 the University of Paris was founded**. This school became the model for most of the schools in northwestern Europe. The various colleges of Oxford opened between 1167 and 1185, but Cambridge was not established until 1209. Meanwhile, the old Arab universities were falling into the hands of Spanish and Italian Christians, and being converted into Christian schools.

The structure of the Medieval universities is reflected in the structure of modern schools. Back at the turn of the first millennium, schools of higher learning were supposed to be like small, liberal democratic states, protected by a papal or imperial `bull' - or law. Each university, though affiliated with the church, was self-governing and democratic. They were basically communities of scholars implanted into a host town, and relations between the host community and the scholars were not always congenial. An argument between the students and towns' people in Oxford, for instance, escalated into a riot, and forced some of the students and faculty to flee the town, in fear for their lives. This incident precipitated the founding of Cambridge University. Nevertheless, the idea of community and collaboration was central to the formation of the schools which have evolved into modern universities. **Medieval universities contained the seeds of modern ideas of higher education**. For instance, academic freedom and autonomy were guaranteed by the self-governing status of these schools. The notion of neutrality, which has in recent years been questioned by rightwing governments as well as by post-modernism, was embedded in the writing of the ancient Greek scholars whose ideas were the backbone of Medieval curriculum. During this period, the Church was remarkably open-minded about the flood of new texts from the Arab Schools, and knowledge was restricted only by the availability of texts and translations.

Another interesting aspect of Medieval University life is that scholars moved around a lot. Universities were considered a sort of extended international community, and people would often begin a degree at one, then end it at another.

Renaissance' means `rebirth' and, in a way, this is exactly what happened intellectually in Europe in the 15th and 16th century. Various circumstances came together at this time which caused a change in people's basic thinking: a shift in economy involving greater prosperity, the discovery of new lands, the fall of Constantinople to the Turks. This last circumstance is of the greatest interest to us. The school of higher learning in Constantinople had a large library consisting of ancient Greek and Hebrew manuscripts. Many of the scholars fleeing from the Turkish invasion of 1453 took books with them into Europe. These manuscripts created a renewal, or rebirth of interest in classical philosophy and learning. The study of this knowledge was the work of the field of humanities.

Restrictions on Universities

There was, however, a basic shift in the way universities operated, from the Middle Ages to the Renaissance. During the Middle Ages, **universities were international**, connected to each other rather than their host communities or nations. Students and scholars often moved from one school to another. The Renaissance ushered in a period of nationalism in many countries in Europe. This was connected to the expansion of European culture through the acquisition of colonies. It was also connected with the religious conflicts between the Catholic and Protestant nations. Schools became more closely connected with their host states. They began to rely on them for funding, and were often quite strongly controlled by them. Queen Elizabeth I, of England, for instance, tried to control virtually all the operations of universities in England. She set a dress code for students and masters, and wanted to be in control of when lectures were scheduled, what degrees were granted to whom, and what was taught at the school, and what disputations were allowed.

On the continent, things were not much better. In the Catholic countries, especially Spain, the Inquisition kept a close eye on the orthodoxy of what was being taught at universities. Anyone who disputed or even questioned the church's doctrines could easily wind up being tortured until he confessed that he was in league with the devil -- then burnt at a stake. Naturally, universities in Spain became quite conservative. In other Catholic countries, the same attitudes towards new, or unorthodox knowledge were evident. Copernicus and Galileo both suffered from clerical persecution, and were kept from teaching their scientific findings. In fact, it was several centuries before the knowledge which they had uncovered was taught at any university. In the Protestant countries, things were only slightly better. In Leipzig, for instance, a whole faculty was fired and rehired as the religion of the ruling classes wavered.

As if the troubles of the universities weren't great enough, most of Europe was dealing with a period of rapid inflation. This meant that poorer students, who had worked their way through school in the past, could no longer afford to attend. At some schools, such as Heidelberg, even professors had a hard time making ends meet. It also became apparent at this time that a new field of studies was emerging: the sciences. However, as always, universities were slow to accept this new idea, and lagged behind the world of scientific learning and research.

In our days... (Reinventing university libraries)
In our days, the rhetoric of student centered learning is slowly being fulfilled. New educational models are being implemented which adopt changing modes of teaching and learning. They incorporate the best of the traditional approaches but offer students much more freedom in choosing the time, location and manner of their learning. Digital technologies, and especially the World Wide Web (WWW), have made it possible to students to access library and information resources at any time of the day or night from their homes, workplaces and community libraries (provided adequate communications and computing infrastructure is available). Students can pursue courses on the Web, interact in formal or informal discussion/tutorial groups, contact their teachers, seek information, etc. Through these developments we are at the cusp of a great evolutionary fault line as we move to truly **open** learning, not just the correspondence college simulacrum we have enjoyed to date.

Early signs are that **this shift will change universities, and university libraries**, even more profoundly than the dramatic changes we have seen in the global banking industry through which, for example, many people can access their funds 24 hours a day almost anywhere in the world.

At this point I think, it is essential to establish a common agreed-upon understanding of them that will serve us, as basis. Therefore, in order to offer a common set of concepts, I present five basic definitions of the term library – as retrieved from the Collins Electronic Dictionary running on an IBM-compatible PC:

1. A room or set of rooms where books and other literacy materials are kept.
2. A collection of literacy materials, films, tapes, gramophone records, children's toys, etc., kept or borrowing or reference.
3. The building or institution that houses such a collection: a public library.
4. A set of books published as a series, often in a similar format.
5. Computer technol. A collection of standard programs and subroutines for immediate use usually stored on disk or some other storage device.

For hundreds of years, the university library has been at the center of research and scholarship. In many universities, it had a virtual monopoly in the provision of information resources to academic staff and students. Whilst, during the twentieth century, expanded interlibrary co-operation, and greater mobility of researchers, has broadened access to the resources of other libraries, to a great extent the mediation of libraries between users and information has remained.

The professionalisation in the exercise of the information profession is still accelerated by the influence of technology on tasks and functions on one side, and changing demands from information users. Technological (especially Information and Communication Technology 'ICT'), economical and social developments have changed the 'Information Space' in which libraries function and users retrieve information. The increase of the amount of information is still enormous. Information is offered on a still growing number of information media via more (electronic) channels than ever before. Now participant enters the information chain between author and user. Others expand their activities to other aspects of value adding and transfer and mediation of information.

At the same time users have access to information in ways that were restricted to 'professionals' until recently. For users **the library is no longer 'the' place to find information**. Internet enabled the retrieval of information that was reserved for 'librarians' for a long time. To satisfy a user needs other and new forms of users instruction en support are necessary. As a result of this tasks in libraries change and with these the list of demands to meet for the staff change. Classic tasks like collection building, cataloguing and indexing change and get another interpretation. We must distinguish between the primary process of the organization, the mission, and the processes that support en enable that primary process. **The primary mission of academic libraries in the 21st century will be the same as it has been ever since 'libraries' came into existence: to supply students and staff with the information they need**. The secondary process is the 'Trias Bibliotheca': collection building, cataloguing and indexing and supply. That means that **the classic function of libraries has not changed, but that the scope and the techniques to fulfill this function have broadened**.

Libraries are developing somewhere on the continuum between the 'Paper Library' and the 'Virtual Library'. In this process the accent shifts from attention for the information sources physical present in the institution to giving access to information for whoever wants it and in the format he/she wants it.

To fulfill the core mission successfully it is necessary that emphasis is given on (new) functions and skills like defining user needs, development of new products and services, users help, information analysis (quality control) and marketing of information products. Didactical and communicative skills and other ways of domain knowledge are important factors in this development. It is important that new developments in ICT skills are adapted and integrated in the relevant levels in the organization. Libraries are in a process of continuos and rapid development. This asks for an ongoing professionalization of the staff. Therefor the need and demand for additional learning is great.

In recent years, however, the introductions, and massive expansion, of electronic information sources, have led many to question this central mediating role.

So, what is, and will be in the future, the **core business of the academic library?** In the past, housing information artefacts, and making them available, was paramount. In the late twentieth century, in contrast, much of our information resource is not housed within the library building at all. In many cases, it is available via the Internet direct to the scholar's workstation. In such an environment, what roles do academic librarians have in the information chain? How can they provide added value?

Traditionally the core roles of academic library staff lay in acquiring, processing, and lending library materials and in responding to user generated information queries. Today, combinations of outsourcing and self-help mechanisms have replaced these previously "core" activities. Instead, **the academic library must focus on new "core" roles**. The modern university is typically involved in three interrelated fields - **teaching, research and community service**. The role of academic libraries, and of academic librarians, must be integrated into all these activities. If it is to ensure its continued relevance in the twenty first century, the academic library must turn from ownership mechanisms to access mechanisms, and from re-active to pro-active involvement in the academic processes of the university community.

Electronic access mechanisms, in particular the use of the Internet, are changing the mode of delivery of academic programs. The concept of **"flexible delivery"** is capturing much attention in many countries. Non traditional delivery of courses has, in the past, been focussed on distance education - provision of academic courses to students who are geographically distant, or unable, because of their personal circumstances, to attend on-campus lectures and tutorials. Traditionally, such courses were print based. The library supported this mode of learning by providing a mail-out service of books and photocopied articles on request, and by responding to student calls for information searching assistance.

Today, new course delivery modes are via the Internet - and such modes **are not restricted to "distance learners"**. The **new client** is a student with needs for more flexible study options, because of changing work patterns and lifestyles. He/she is as likely to be locally based as to be studying at a distance. Without pro-active intervention from academic librarians, such programs often provide only pre-packaged information resources to support their coursework material. There is no requirement for the student to become involved in extended information research. Such limited approaches are educationally dangerous. This is so, not because they remove the need for provision of library services, much as librarians may lament this. Rather, it is because such forms of course delivery remove the need for students to develop critical information literacy skills - skills in locating, sifting, prioritizing and integrating information, in order to present a well documented argument, or a case taking account of current research. The student's capacity for life long learning is severely impeded by such restricted curriculum delivery formats.

Librarians, however, can retain an important contributory role within such new delivery modes. Increasingly, teaching staff are coming to accept that such forms of course development require specialist skills. Whilst teaching staff may rightly claim expertise in the subject discipline, many are willing to admit the need to work with specialist educational technologists in order to mount effective units/subjects on the World Wide Web (WWW). It is critical for educational outcomes that librarians ensure that they also become part of such teams, and that their roles as information content specialists are similarly recognized.

Academic librarians can no longer afford to sit in university library buildings, waiting for clients to seek them out. The librarian's skill must now be taken to the client. The place for an academic librarian in the future will be outside the Library building, actively involved with the academic community. Most university libraries have adopted the concept of **"liaison librarians"**, professional staff whose primary responsibility is to work with the staff of a particular faculty or academic department, in order to ensure that the information needs of the academic unit are being met by the library service.

In order to fully integrate itself into the academic process, the University Library will need to seek out opportunities to establish its value as a partner in course development and delivery. At many universities, each academic faculty maintains a Teaching and Learning Committee, which oversees matters relating to coursework programs. In almost all cases, the Library has succeeded in having key liaison librarians co-opted to join, and thus contribute to, such committees. As well, these librarians seek out, work with, and, at times join, course development teams which are constructing new courses for accreditation.

What value can librarians add to such teams? Certainly, provision of advice on how to locate resources to support program content is important (the "resource professional" role). However, equally important is the need to ensure that the way in which the curriculum is constructed encourages student research, information seeking, evaluation and synthesis, rather than simply feeding back specific data in rote fashion. As Coaldrake and Stedman recently commented in their book *On the brink: Australia's universities confronting their future:*

> "...the best education a person could receive would be one where they learned how to learn, ...this is far more important than learning particular facts or techniques. Universities which provide a stimulating, broad and challenging education, for young people in particular, should be highly valued"
>
> (Coaldrake and Stedman, 1998, p.42)

Teaching staff needs to be convinced that developing courses, which impart skills to facilitate further learning, is critical to any academic program.

In providing infrastructure support for the University of Future, the academic library's outreach activities can only be enhanced by operating in liaison teams beside IT support personnel and educational technologists. The skills of these three groups are today indispensable to the formulation of **flexible courses based on a combination of online, audiovisual and print technologies**. Support for the research activities of university staff and students can similarly benefit from input from such multi-skilled teams.

There exists in research, as in the teaching arena, a naive view that the skills of the academic librarian will in future become irrelevant, as unmediated information delivery becomes the norm. It is suggested that the academic will interact directly and effectively with her/his relevant sources of research information. Such views ignore the limited personal capacity of most teaching and research staff to manage the burgeoning floods of literature available electronically in every field. The need for skilled information navigators to guide, trains, and (at times still) to mediate for users, remains significant. Academic librarians should fulfil this role. Often, they will need to work with research clients individually. They will develop in-house specific subject gateways, adapt external gateways for best local use, seek out and advise on appropriate information resources (both print and URLs). In some ways they will act as faculty research assistants, but research assistants operating at a high professional level. The best self help mechanisms for resource users may well be developed in-house, whilst drawing heavily on globally available tools, such as international Internet subject gateways.

As resource constraints increase in most universities, the academic library will be able to fulfil its new mission only by a substantial re-orientation of its services. No longer are acquisition, cataloguing, lending and query response the key functions in such a mission. Through use of substantial process re-engineering, staffing requirements in these areas can be minimized. In fact, they must be minimized if the library's expanded role as educator, developer and information navigator is to be realized.

What is our new "core" business? The **"library without walls"** may not yet be an immediate physical reality. However, the increasing role of the academic librarian as a partner in the teaching and research process will be critical if the university library is to make the transition which will enable it to remain relevant and valued within its academic environment well into the twenty first century.

"New Skills Base"
The crucial issue as we move from library focus to direct electronic user focus in the next decade is the definition of the role of the librarian and information professional. Are we leaders, supporters, participants, supplicants or mere spectators in the inexorable process of globalization, uncertainty and information potential? Are librarians to be archival museum keepers, Internet subject content facilitators, webmasters, metadata creators, virtual university content providers, electronic publishers or entrepreneurs?

Such elements are a far cry from the requirement of say only two decades ago. Yet many of the middle to senior staff in our libraries were brought up in the more constrained environments of the role of the librarian. Can gradual change be introduced or should libraries go for the big bang?

The staff of the digital library will have to be flexible, project based, aware and that the scholarly communication environment is intrinsically unstable, if dynamic and demanding. Organization structures need to be reviewed to overturn innate print conservatism and to question historical assumption. (Tennant 1998) Contracts for staff may become more of a norm than "tenure". As funds decline in libraries these staff who can find and deliver the information, preferably with a value added component, will be rewarded.

Staff need to be well informed but the electronic era can provide a deluge of information (eg by institutional, national and global e-mail lists). Staff must provide their own filters and not become involved in "turf wars" which don't involve them. Staff can be useful catalysts by questioning activities and providing diverse views but may simply complain without offering rational or constructive alternatives. Weariness and overload exacerbate this process.

Some of the skills learning can be virtual, i.e. training courses available on the Net. Many of the library and information activities could be outsourced in the twenty first century as the diversity of skills is found wanting in one institution and labor costs are reduced by the use of global utilities. As important as a new skills base is the important need for existing staff to change working habits and attitudes rather than simply complain that the world isn't what it was when they entered the profession.

Information Professional Characteristics
A pre-conference seminar of the 1997 European Business Information Conference the characteristics of the information professional of the 21st century are spelled out very clearly and no practising librarian would disagree with the KSAs (Knowledge Skills Ability) listed (EBIC, 1997). These are, in summary form:

Skills	Experience	Attributes	Behaviour
Information: collection, structuring, retrieval, filtering, analysing design.	**[pure] IT**	**Business focus**	**Confidence**
Communication: written, presentation	Communication	Team approach	**Influencing**
Skills transfer: training, coaching	General management	**Value ethos**	Sharing
Value added	**Information management**	People [customer] focus	**Skills transfer**
	Human relations	Leadershi	**Risk taking**
	Strategic planning	**Innovative**	**Identification with the business [or institutional aims]**
	Operations planning	**Understanding the potential of IT**	Listening skills
		Flexibility	**Understanding the issues and ability to judge relevance, quality and reliability**
		Adaptability	Networking
		Recognition of opportunity	

(New skills are in bold. People from the non-business sector may wish to question the business terms used in this list).

There is already a shortage of supply, a lack of people with the right combination of skills. The new roles for information and knowledge workers require people with ambition and drive, with business understanding and insight, with in-depth knowledge of IT applications and developments, as well as the more traditional skills of information management.

Conclusion
In the electronic environment libraries need to recognize that increasingly they are not the only game in town. Twenty four-hour online bookshops can provide reference services as well as information to the global information user. Superbookstores have in some ways replaced public libraries for the more affluent of our citizens. Academics can order books on line and can access information via subject gateways.

Meyer (1997) has argued that libraries must broaden their understanding of what it is they do and must align their personnel policy to take the technologically adapt. His vision is that librarians who were "once cataloguers, book buyers and reference searchers, will become network managers, database integrators, fuzzy logic applicators and artificial intelligence experts, and graphical interface designers".
This may be a brave new world and it will not come about overnight but libraries and librarians in a digital world will have to rethink their roles as traditional boundaries, both intellectually and geographically, become blurred if they are to survive in the twenty first century.

To prepare for the future we need to be future prepared.

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IATUL

FACING FUTURE USERS – THE CHALLENGE OF TRANSFORMING A TRADITIONAL ONLINE DATABASE INTO A WEB SERVICE

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Our users in the next century will be a generation grown up with mobile phones, Internet connections and a hectic lifestyle. They will call for immediate actions and solutions to their problems. Improvements are expected in high speed networking from a new generation of communications satellites which will make the Web more accessible and provide data at a greater speed to the end-users. The impact of the Web on information management is a transfer from building physical collection to providing electronic access to distributed documents regardless of the physical location of the user or the information. The success, however, will not only depend on high capacity networks, but it will also depend upon the quality of the service provided to the users, i.e. how well the information is organised and managed.

Background

In 1987 eleven countries had a vision: to develop an single channel through which they could share their nationally published energy research and technology information. The Energy Technology Data Exchange (ETDE) [1] agreement was the result of this vision and today 19 member countries span four continents. In Asia: Japan and the Republic of Korea; in Europe: Belgium, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Poland, Spain, Sweden, Switzerland and the United Kingdom; in North America: Canada, Mexico and the United States; and in South America: Brazil. The participating countries conduct their information exchange as an agreement under the International Energy Agency (IEA) and the concrete result of this agreement is the ETDE- Energy Database.

To build the database the ETDE-members collect the energy-related research and technology information published within their borders. Members are responsible for submitting the information in a standardised form using agreed-upon guidelines and subject analysis requirements. In Finland, the Helsinki University of Technology Library functions as the Finnish input centre and takes care of the practical work. The funding organisation is the Technical Development Centre of Finland which therefor acts as the Finnish member organisation. The ETDE co-operation as a whole is coordinated by a central operating agent, the U.S. Department of Energy's Office of Scientific and Technical Information. Because of the decentralised input preparation only a minimal work is required by the Operating Agent to consolidate member input for the database. Today the ETDE database which contains over 3.8 million abstracted and indexed records is the world's largest and most comprehensive bibliographic database in the field of energy research and technology Another important aspect of the ETDE agreement is the exchange of full-text of documents which are not commercially available and therefore not easy to acquire elsewhere. These full-text documents are available on microfiche and since 1996 in electronic form. Together with the bibliographic database the storage of full-text documents forms a very valuable information source and enables development of new products.

Although the vision from 1987 has remained unchanged the mechanisms are evolving. There are also financial constrains. After ten years of uninterrupted growth in membership, the ETDE Agreement lost one valuable partner when Australia withdrew, hopefully only temporary, its membership. Many members are facing budgetary problems. The value of the database is not easily demonstrated to the funding organisations, which all are governmental bodies. Although the development of information services and information technology are considered important, the cost to compile and provide information is not always recognised.

The database is designed to provide valuable information not only for governmental bodies but also for the industrial and academic sectors. The access is available to organisations, libraries and institutions in the ETDE member countries. The users consist of a diverse community: scientists, engineers, policymakers, intermediaries and students. The database has been offered to member countries through the large online-hosts Dialog and STN International and on CD ROM. In addition to these some countries have developed their own products usually in the form of organisational in-house systems.

User surveys

The results from user statistics indicate that during the 1990's there has been a overall decline in both the hours of use and the total amount of retrieved information. Another observation is the change in the user profile. There has been a continuous drop in usage by the researchers in the academic world. In the other sectors the number of users has slightly increased or remained the same. The decrease among the academic users has occurred along with the introduction of the Internet graphical user interface and browsers. The trend seems to be quite evident: users are likely to turn to the most easily accessible sources of information, even if it is not the most appropriate one. The aim of the ETDE Agreement was to provide a database as a research tool to the entire community of energy science and technology researchers within the various member countries. In this respect ETDE is now faced with the need to make the information in ETDE database more attractive. The new technologies for information exchange must be exploited. At the same time the need to show value for money is evident in all member countries. Thus the ETDE is looking for cost effective solutions by developing a new product which should be user friendly, owned by the ETDE and accessible over the network.

The new web service

To meet the challenge, a subgroup was established in 1998 to prepare a request for tender concerning design, operation and maintenance of a web-based information service for end-users in the energy field, " to pursue a virtual library with the ETDE Energy Database as the core and linking any number of suitable distributed Web sites containing energy research and technology information in order to provide energy-related scientific and technical information as well as full-text". The working schedule for defining the technical and the administrative requirements was very tight. The decision making process involved both the Technical Working Group and the Executive Committee. It is rather difficult to establish a competitive information product based on joint agreements because the pace for the markets is far more rapid than that of an international community.

The call for tender resulted in three bids which were submitted by Germany, the Netherlands and the United States. These were evaluated by the Technical Working Group and by an ad hoc group set up only for evaluation purposes. The member community was approached to present their views concerning a possible Web based ETDE product and their attitudes towards the costs involved in developing such a product. The three formal bids were all regarded as too expensive solutions and hence they were all rejected. It was noted that the original specifications indeed may have been too superfluous. At the end the ETDE community agreed to build its future service on an existing service, the U. S. Department of Energy's Information Bridge. It will provide the ETDE members a possibility to clearly identify the product on the Web, not just another database among databases. The new Web product will also be a clear compromise between the functional properties and cost factors. It will be accessible within the member countries in October 1999 and it will provide both bibliographic information as well as links to the full-text of non-conventional literature cited in the database. The value of the ETDE database will remain in its content because it contains energy research and development information not published anywhere else. [2, 3]

The evaluation of metadata formats

Along with the process of introducing the database on Internet as a Web product the database record format was under evaluation with the ultimate goal of developing a new web-compliant data model for the ETDE and INIS databases. INIS (International Nuclear Information System) is the International Atomic Energy's bibliographic database using the same record structure. Of these two systems INIS is one of the oldest online databases and ETDE adopted the INIS record structure to facilitate records exchange between the two systems. With the purpose that the record structure should reflect the realities of a web-based scientific culture for search and retrieval of information, ETDE and INIS did jointly fund a study to look at new metadata structures. A contractor outside the ETDE and INIS communities was hired to collect, review and evaluate document-related metadata formats, both formal and de facto standards as possible models for conversion of the present format. [4]

The work was conducted under the guidance of an expert group with delegates from Australia, Canada, Finland, Germany, The Netherlands, United States and the INIS Secretariat. There were also assistance by the Operating Agent with the overall aim to simplify the current record format and reduce costs.

Data used in the evaluation was obtained from traditional and Web-based sources. Furthermore, interviews with publishers, database producers and metadata experts were carried out as well as input from the Expert group. The selected metadata formats for evaluation were Dublin Core, Scientific and Technical Attribute Set (STAS), Global/Government Information Locator Service (GILS) Core Elements and finally Text Encoding Initiative (TEI) Electronic Title Page Elements.

The Dublin Core Element Set [5] has been defined to support information discovery in the networked environment and the work had begun under the auspices of OCLC at a meeting held in Dublin Ohio. The Dublin Core element set consists of 15 elements, which are considered to be the minimal element set into which a description of an electronic resource can fit. These base elements can be extended by qualifiers, which can be used to define a content of a element and by subelements. Dublin Core is protocol independent although it is primarily accessed via HTTP. The Warwick Framework and RDF or Resource Description Framework (http//www.w3.org/TR/REC-rdf-syntax/, W3C Recommendation 22 Feb 1999) are architectures associated with Dublin Core and other formats. Since they are intended to provide a framework for many metadata initiatives, they have also been considered in the evaluation.

STAS [6] was originally developed by Chemical Abstracts Service (CAS) using the Z39.50 protocol. The STAS elements were defined in 1994 by a joint group including Fiz Karlsruhe, Chemical Abstracts, Dialog and CNIDR - Center for Networked Information Discovery and Retrieval. The development of STAS is a practical one and it is built on the elements that needed to be mapped from existing databases. There are 63 elements defined in the BIB-1 set developed for search and retrieval of bibliographic scientific information. If a mapped element does not match the element definition in the BIB-1 exactly, a new element is created within STAS.

The TEI [7] is an SGML-based DTD (document type definition) for markup of full text documents and it has been in use for several years primarily in the humanities. The focus of TEI in the evaluation was not on the SGML structure, but on elements identified for the description of an electronic title page. In practical usage the TEI Electronic Title Page has incorporated other elements than might appear on the title page itself. For example availability information has been added. The number of the core element exceeds 50 depending on the implementation.

The Government/Global Information Locator Service (GILS) [8] was developed by the U.S. Federal Government using the Z39.50 protocol for implementation. GILS is a standard for cataloguing, searching and retrieving information about resources. The cataloguing on the resource level includes 30 core elements, although this is varying by implementation.

These four metadata formats were evaluated against criteria established by the contractor and the ETDE Expert group with the objective to reduce complexity, support interoperability between formats and facilitate data import and export. Additional important factors were: continuity meaning degree of standardisation, use by similar communities and the extensibility of the format. In the evaluation Dublin Core and STAS were ranked highest against the established criteria. In order to provide more information about their applicability for the ETDE/INIS databases, the present ETDE/INIS elements were mapped to the Dublin Core and STAS formats.

The conclusions of the study made by the consultants were to "adopt the Dublin Core with its 15 elements and its extensible qualifiers and subelements as the document level minimal element standard". The Dublin Core is relatively stable with development and implementation projects on an international scale. Although it is not a standard, the organisations involved are likely to continue to move the convention forward to standardisation for use in broader Internet environment with new technologies such as XML and RDF. The second recommendation was to extend the Dublin Core by using STAS element definition for special scientific needs, if necessary in the future. The third recommendation was to use an SGML-application to link to full text using the Dublin Core names as the header element tags in order to provide continuity. This would also promote the automatic creation of Dublin Core elements from the original electronic text. One of the original objectives was to reduce the cost of record creation. It was not showed, however, that the use of the Dublin Core would in fact result in the reduction of the database production costs. Furthermore the ETDE Expert Group was not able to form a general recommendation on what metadata format to choose or the timing for the change. A final decision was regarded too difficult to make at the time when the practices are still under development. The U.S. Department of Energy had in between decided to move into the direction of Dublin Core. It was agreed to wait and see the results of the U.S. experiment using the Dublin Core metadata format and its impact on ETDE Database before taking an international decision. The task of redesigning the present ETDE/INIS record format is still ongoing and active work is carried out on the new format structures and how these can be realised.

Conclusions

Will the new ETDE Web product find its users from the new generation demanding immediate solutions, remains to be seen. It is clear, however, that a pure bibliographic database is no longer sufficient. Added value produced via linking full-text documents and other relevant Web-based information will be the key to success of the ETDE Energy Database.

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Abbreviations

IEA - International Energy Agency
ETDE - Energy Technology Data Exchange
INIS - International Nuclear Information System
STAS - Scientific and Technical Attribute Set
GILS - Global/Government Information Locator Service
TEI - Text Encoding Initiative
SGML - Standard Generalized Markup Language
XML - Extensible Markup Language
RDF - Resource Description Framework

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IATUL

GREEK ENGINEERS AND LIBRARIES IN THE COMING YEARS: A (HUMAN) COMMUNICATION MODEL

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Introduction

It is important to investigate the information behavior of a particular professional group in order to examine the way they search and use information. Engineers belong to a specific category of scientists, who are also professionals involved in practical things for which they need very simple or very complex pieces of information.

Their information literacy and information seeking and use behavior have been examined in several papers in the literature as well as the similarities and differences among engineers and other scientists. Engineers' professional interests are mainly directed to technology. Technology outputs are products, processes and services, while science "studies problems usually generated internally by logical discrepancies or internal inconsistencies or by anomalous observations that cannot be accounted for within the present intellectual framework".

Taylor has stated important points on engineers' information habits: ".... engineers work within time constraints..... engineers tend to minimize loss than maximize gain when seeking information..." Engineers need a specific answer than a set of documents in which they will have to search for the answer they need.

Another important point is that engineers prefer the most accessible sources than highest quality sources. The proximity to the physical space has often been mentioned in literature, where a positive correlation was found between the physical proximity to an information source and its use.

Accessibility, perceived technical quality and experience with the information channel or source are considered as the basic determinants for engineers in order to gain access to an information channel, following the law of least effort. Similar conclusions are mentioned in an other study, where also technical quality, reliability and relevance are rated by engineers as the criteria to choose an information channel, while accessibility again is the most important criterion, even if the source to be accessed is the least useful. Libraries are not the favorite place for engineers to visit, unless they spend the least time and the least effort in order to get the specific answer they need for their specific problem.

The Technical Chamber of Greece

The Technical Chamber (TEE) is the professional organization of Greek engineers as well as the consultant of the Government to technical issues. It has a technical library in Athens founded at the beginning of 30's with the aim to serve TEE administration bodies as well as engineers all over the country and any other interested in engineering aspects. Besides the central services in Athens, TEE also has 15 regional sections and most of them have small libraries to serve the local engineering community. All libraries are connected online to TEE network and use an integrated library system installed in Athens, although quite a few regional libraries manage to follow the fast automation activities that take place. The reasons may vary:

lack of staff, unwillingness of the local TEE administration to employ the appropriate staff, unwillingness of local staff to get involved and learn new things.

On the other hand, some interesting and somehow urgent issues arise from the changes taking place everywhere in information areas:

- technology looks like the main direction on which today libraries and their staff have to be interested a lot
- information and data have to reach everywhere, in a friendly and easy to use environment
- people in the libraries must learn how to use the new technology, they have to be trained, to be ready to accept the new situation in order to be able to work in the new (technological) information environment
- users of the libraries must learn how to use the new technology; they have to be trained, to be ready to accept the new situation in order to be able to search in the new (technological) information environment.

So, the issue is not only technology and information on the network but also people. An interesting view has been expressed recently according to which too much discussion is found in literature on the various concepts of the electronic library, where the emphasis is mainly on technology and information resources but much less discussion takes place on human aspects like the role of library staff and library users.

My attempt is to look on these issues as appearing in Greek situation and particularly at the Technical Chamber of Greece, a professional organization that develops an ambitious library system for the satisfaction of the information needs of its members:

- the system has solved the technological problems
- there is a network
- there is an integrated library system
- all bibliographic information of documents physically stored in the libraries can be entered in the union catalogue
- there is the possibility for coordination and cooperation among TEE libraries
- there is the possibility for everyone to have online access to the system
- there is the possibility for every one to borrow documents

The discussion here is what do engineers need, how do they behave, what do they think on above possibilities, how do they see the changes to come.

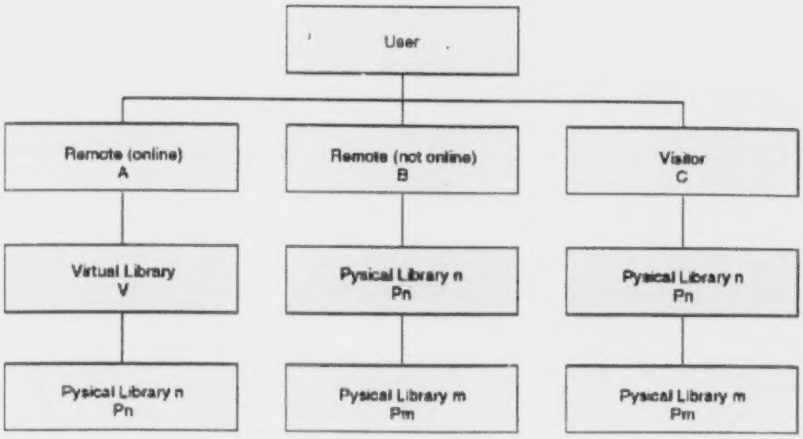
The model

In an attempt to study the needs and behavior of a technical library users like that of the Technical Chamber and the issue of developing virtual library services, 3 types of users are proposed:

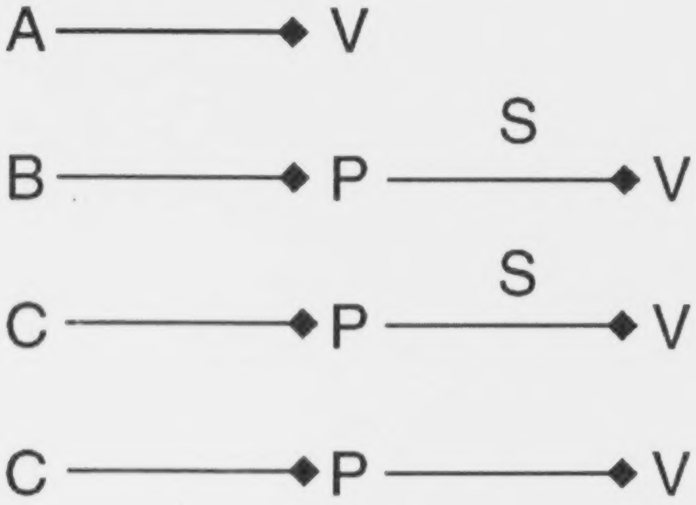
- User A: remote online user - the remote user who has online access to library services through the network
- User B: remote not online user - the remote user who communicates by surface mail, telephone or fax
- User C: visitor of the physical library

The model is presented in the following diagrams:

[diagram 1]

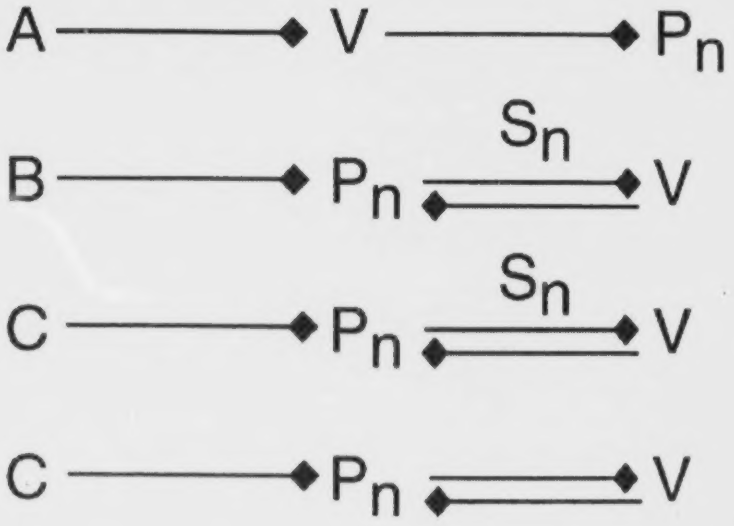


It is supposed that a number of physical libraries exist (P_i) while a virtual library system (V) has been also established which can serve the users from everywhere. In the above diagrams, only the online user (A) can have a direct access to the virtual library. A case could be:



where S is the library staff.
Users B and C do not have a direct access to the virtual library, but only through the physical library. As we can see, user B will have access through the staff who will do the actual access to the virtual system as there is no online connection for B, while user C can have access from the physical library either with the help of the staff or on his/her own. But at the end, even user A may have a contact with the physical library in order to get some services which may not be offered online (e.g. loan, help etc). So, the flow is better described as following:

BEST COPY AVAILABLE



In the above diagrams, one can see that the physical libraries are always used, either as the first step for the user to get information or a step after the virtual library. An interesting point is that either the user starts from a virtual or a physical library and then uses the services of the other, the last point in the model is the physical library.

Preliminary survey
A questionnaire was sent to a small number of engineers containing general queries on the use of computers, Internet and libraries. The sample is quite small because my intention was to test the questionnaire for its content and the coverage of issues I am interested to search as well as the method chosen to evaluate the results but simultaneously to get a preliminary view of Greek engineers' information needs and habits. The purpose of the survey is to test the model described above and proceed to further investigation according to the evaluation of the questionnaire.

There were 26 replies until the deadline set for this presentation, all from Athens (1 architect, 1 surveying engineer, 1 electrical engineer, 3 computer engineers, 3 civil engineers, 4 mechanical engineers, 5 metallurgical engineers and 8 chemical engineers). They have graduated from technical universities in various periods of time (from 1963 to 1996). 7 of them have received a MSc degree and 8 a Phd. 2 of them are professors at the National Technical University, 11 work in the public sector (public services or organizations) and the rest in the private sector (10 of them are free professionals, 2 work in private companies and 1 in the industry).

Among the 26 respondents, only 1 has not access to a computer while 19 have access at home, 24 in the office and 5 have a laptop computer. 19 of them can work in DOS environment, 23 in Windows, 1 in Macintosh and 9 in Unix. Out of 10 free professionals, 9 of them use a computer - 6 at home and 8 in the office.

16 have access to Internet, 11 at home and 15 in the office. 12 have a dial-up access to the network while 7 have access through a leased line (in addition or exclusively). 15 engineers use electronic mail - 8 from the private sector, 5 from the public (out of 11) and 2 from the university. More than half of them use it everyday.

The use of electronic mail for education, research, professional awareness, professional communication, personal use and entertainment was evaluated marking 1-6 for "very useful", "useful", "not important", "not necessary", "do not know", "not involved in this activity". About 15 or 16 responses were received for this question, including for "useful" or "very useful»: 10 for education, 10 for research, 15 for professional awareness, 16 for professional communication, 11 for personal use and 3 for entertainment. It is clear that professional involvement is the first reason to use electronic mail.

16 of them visit web pages on the Internet, 9 have a telnet access and 10 use the ftp protocol. The evaluation of web pages similar to electronic mail gave the following results for "useful" or "very useful" from an average of 14 total responses: 14 for education, 11 for research, 14 for professional awareness, 12 for professional communication, 10 for personal use and 9 for entertainment.

18 use library services, 10 of them use academic libraries, 13 special libraries (7 of them come from the private sector) while also 4 use libraries of public organizations that can be considered as special libraries as well. In the query, which of the library they have used at least once, they responded:

TEE Library (Athens)	18
National Technical University of Athens Library	12
National Research Foundation Library	9
Eugenides Foundation Library	6
Hellenic-American Library	5
Commercial and Industrial Chamber of Athens Library	4
Demokritos Library	4
Hellenic Standardization Organization Library	4
British Council Library	3
University of Patras Library	3
Public Power Corporation Library	2
Technical University of Xanthi Thrace Library	2
TEE regional library	2
ACM online	1
Aristoteleian University of Thessaloniki Library	1
Department of Agriculture Library	1
Goethe Institute Library	1
National Library	1
Technical University of Crete	1

The first place of TEE library is an important point here as the majority are not coming from the academic sector (8 of them are free professionals). It is also noteworthy that all libraries ranking first are in Athens.

Among the 18 who use the Athens Library of the Technical Chamber, 10 use it often or very often while 5 of those who do not use it do not know what services it provides or do not need it. The services for which TEE library would be useful are: bibliographic research (15), loan (14), Journal articles delivery (9), Current awareness in scientific issues (11), Current Awareness in professional issues (7), Current awareness in TEE activities (4). 10 of them have already ordered photocopies of journal articles. The point here is the smaller number on professional awareness requirements. This issue might be connected with the existence of TEE Data Bank that is oriented much more on such areas.

8 of them have visited library web pages, 8 electronic journals and 8 digital libraries. A definition of the virtual library was given and the engineers were asked to evaluate it for the various services it might provide. The responses given for important or very important were the following:

Library catalogs (20), Electronic journals (19), Access to bibliographic databases (21), Access to full text digital libraries (21), Description of library services (9), General information for engineers (13), Firms data (12), Legislation for engineers (14), Economic data (13), Journal articles delivery (20), Connection to electronic addresses of engineering associations (15), Connection to electronic addresses of other scientific and professional associations (12), Connection to electronic addresses of general interest (12). When they were asked to reply what they will do if any of the above services is fee-based (they will use in any price, they will use if price is reasonable, they will not use), they looked reluctant to pay and some of them expressed a very negative view for this possibility. TEE is considered as their professional organization that has to provide free library services to its members. One respondent made the comment that the electronic library cannot be an electronic bookshop.
Most of them considered that the virtual library might have positive impact on their job.

For the help they would need in order to access the virtual library services, "highly preferred" or "acceptable" are: printed guides (17), online guides (19), open courses (10), personal communication (17), telephone communication (15).

It is important that only 9 would like the network communication to replace entirely the visit to the physical library. Those who prefer the network communication, support that there will be independence to physical location and time constraints, that visit to physical library costs time and money. The majority however, prefers the personal contact with the library staff and supports that it is easier to retrieve information browsing among the shelves and discussing with the staff or other users who already have such an experience. A computer engineer expressed the view that anything that might waste time would not be useful, even if this is a library in an electronic environment.

Conclusions

The number of the respondents is very small and of course one could say that the present results may not represent the whole image, although my personal experience could confirm most of them. Some points mentioned in bibliography have been also found in the results, like time and location constraints. The method is described and some preliminary results are presented in this paper, with emphasis on engineers as users of electronic library services. Issues that have to be further investigated through a more representative sample are:

- Internet and library use by specialty, place of living and type of work.
- Information needs and behavior (kind of service, fee- or not fee-based etc)
- Study of the 3 types of library users mentioned in the model
- Role of the physical libraries and their staff in the model
- Services provided, communication with the local staff, requirements for the staff
- Role of the Technical Chamber library services on the various engineering groups (academics, free professionals etc)

The overall issue is to investigate the balance between personal and virtual communication among users and staff. We have to study if and/or how the vast progress of technology and information resources electronic management in the coming years will affect the human communication or vice versa. The engineers are a good example, as those having the most direct relation with technology.

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USER-FOCUSED STRATEGIC SERVICES FOR TECHNOLOGICAL UNIVERSITY LIBRARIES

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Development of the Strategic Plan

The New Mexico State University Library serves New Mexico State University, a doctoral granting, land grant, minority-serving Research University located in southern New Mexico. The New Mexico State University Library developed rapidly in the early 1990's. A second facility was constructed, increasing the total size of library facilities to 25,000 square meters. The budget grew at annual rates exceeding 10 percent. The collection reached one million volumes. The growth of library services was significant in many areas. During this time, a process oriented long-range plan, guided the University Library development.

By the mid 1990's, significant changes in the university, technological, political and scholarly information environments suggested an impending period of rapid change, yet stable or declining resources. The University Library leadership wanted to build on the library's growing strength within the university community by creating a strategic plan that would: respond dynamically to the declining fiscal environment; create an appropriate research library role; take advantage of electronic opportunities; and further strengthen relations with users through collaboration and partnerships. We believed that all of these initiatives required a strategic approach, incorporating lower level decision-making, staff flexibility, and responsiveness to quickly changing user needs (Bundy, 1997; Hayes, 1993).

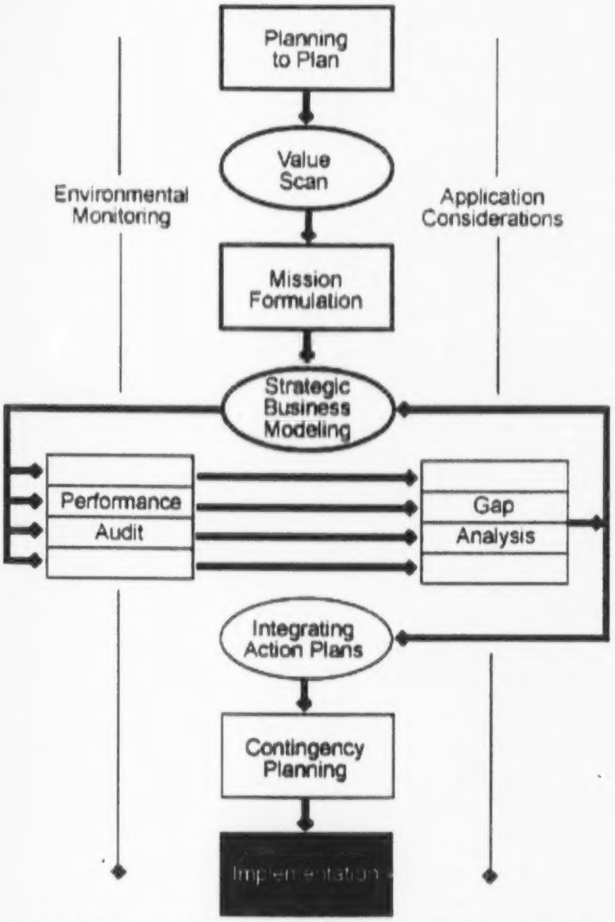

Fig. 1. Applied Strategic ***Planning Model.*** *From Goodstein, et.al., 1993*

Work on the new plan began in late 1995. Tommy Thomas, who is head of organizational development for the State of New Mexico, was hired as a consultant. A planning committee, composed of five library personnel and three university representatives, was named to guide the planning process. The Dean of the Library prepared and distributed a vision statement outlining his thoughts on probable futures. A two-day conference, titled "Choosing Our Future", attracted 79 participants, approximately half from the library and half from the university and the community. At this conference key points in the planning process were identified and initial drafts of missions, goals, and objectives, were discussed and transcribed. The process adopted is drawn from Applied Strategic Planning (Figure 1).

The Environmental Scanning Committee gathered information about trends that could affect the strategic future of the library. Their information was used throughout the process and forms the basis for ongoing market research to guide annual updates in the strategic plan. The Value Scan and Mission Formulation Committee identified the values of the library and articulated the purpose and mission of the library. The Strategic Business Modeling Committee used information from the planning conference and the Mission Formulation Committee to create the strategic goals that provide focus for the library's future direction and resources. This committee identified critical success indicators that are used to measure progress towards goal attainment. And the committee also identified six strategic thrusts that are used to guide and evaluate annual departmental action plans. The Performance Audit and Gap Analysis Committee reviewed the mission and vision and articulated potential objectives and activities for each goal. This committee also conducted a strength/weakness/opportunity/threat (SWOT) analysis to assure that the plan capitalized on the library strengths and opportunities and recognized its weaknesses and threats. This committee also conducted a gap analysis intended to identify the gaps between the library's current performance and its desired future. The content of the strategic goals is based on the Performance Audit and Gap Analysis. Finally, the Contingency Planning Committee reviewed the entire plan and recommended contingencies to assure the success of the plan. Among other recommendations, they suggested the creation of a standing committee to accomplish the strategic goals identified in the plan.

This level of detail and participation was consciously undertaken to increase the acceptance of the new plan. Everyone on the library staff who wished to participate in the planning process did so. All interested outside parties, including the faculty library committee, were encouraged to contribute to the planning process. At the end of the process there was good general understanding of the strategic plan, its goals and rationale. There was also an increased commitment towards achieving the goals through departmental action plans and annual personal objectives.

Strategic Plan Summary

The full strategic plan is available on the web at http://lib.nmsu.edu/aboutlib/straplan.html.

The following is a summary.

Vision

The people of New Mexico State University Library will assure a creative and supportive environment for intellectual inquiry by providing user-focused services to obtain and evaluate scholarly information and knowledge – in many formats and from multiple sources – necessary for the NMSU community to create new knowledge, to increase understanding, and to develop wisdom.

Mission

- Selecting, acquiring, and organizing resources
- Providing human and technologically mediated access
- Teaching users to locate, obtain, and evaluate information

The Library provides leadership to New Mexico State University in:

- The distribution of scholarly information
- Collaborative information projects
- Electronic access and delivery of information

Values

New Mexico State University Library values the University's mission and the library's role in producing educated graduates and citizens. We recognize the importance of our users and work to provide them with dependable, timely, comprehensive, quality information. We recognize our role in adding value to information by selecting, organizing, reformulating, synthesizing, and evaluating. We value the diversity of our users, the diversity of information in all its forms, and the diverse ways in which information is used. We value access to information and strive to eliminate or reduce barriers created by physical location, cost, censorship, difficulty of use and user status. We value the skills, talents, potential, and individuality of our library employees and encourage their unique contributions through training, opportunity, and recognition. We rely on leadership, collaboration, and innovative solutions-both human and technologically to achieve our goals and maintain our values.

Goals

1. Continue to develop a cooperative, user-centered culture.
2. Acquire information/knowledge resources to fulfill the university's land-grant mission.
3. Continue to develop user-focused products, services, processes, and systems.

4. Develop instructional initiatives and programs to support the university mission, extending from basic information literacy competencies to life-long learning skills.
5. Provide the means and infrastructure for the management and distribution of scholarly information.

Organization
The revised NMSU Library organizational chart is shown in figure 2. There are seven functional departments, each headed by a department head. There are four interdepartmental committees, including Policy, Management, Research and Service Support, Instructional Support, and Bibliographic and Collection Services Support that focus on library-wide functional issues. The Associate Dean is responsible for library operations. The Dean is responsible for policy, funding, and university relations. The Faculty Senate Library Committee advises him on matters of faculty interest. This library organization was arrived at after discussions of how best to implement the strategic plan and to reflect its mission and goals (Eustis, 1996).

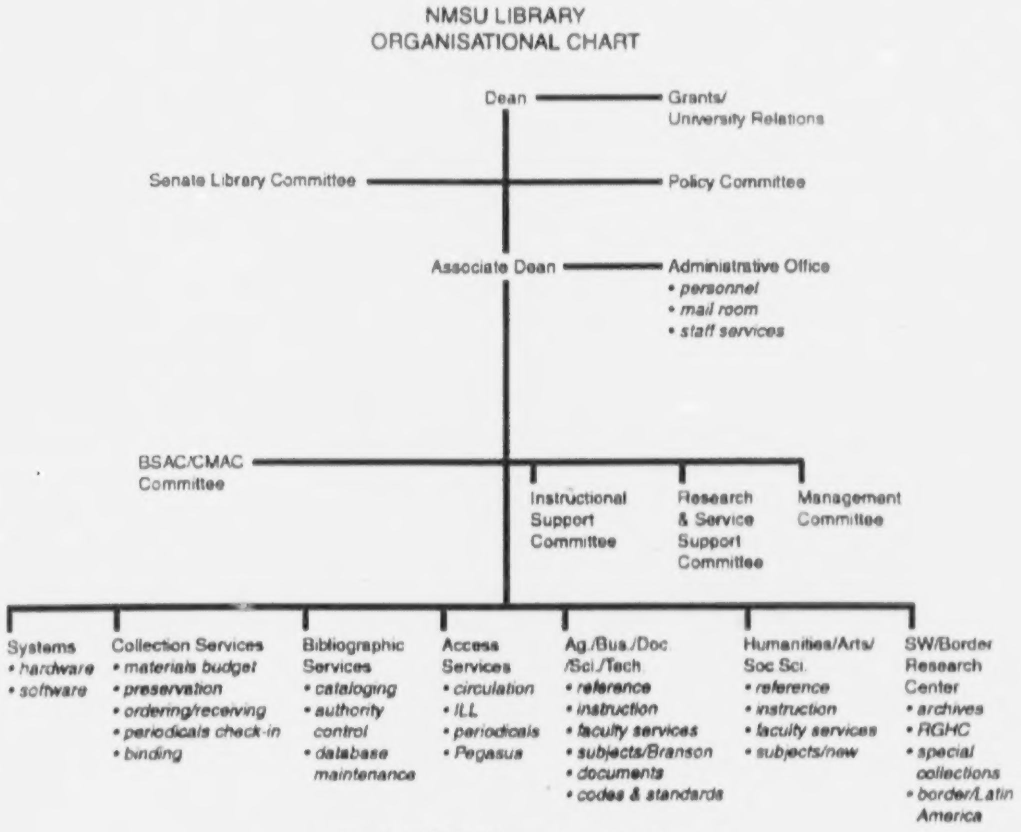

Fig. 2. NMSU Library Organization

Selector-Liaisons
To implement user services emerging from the strategic plan, the Library has created the new role of selector-liaison. Individual librarians (who hold faculty rank at New Mexico State University) are responsible for coordinating all services with each of our 45 academic departments. It is common for librarians working in public services units to be selector-liaisons for two to four academic departments. Selected librarians with graduate degrees in subject disciplines and work in other library units can also be selector-liaisons for academic departments in their area of subject expertise. Responsibilities include: identifying emerging service needs; working with the departments on their planning, research, and funding efforts; selection and retention of library materials; providing research reference; and coordinating library

instruction for courses offered by the department. Selector-Liaisons sit in on all the committees of the library and form the vanguard that values their relation efforts. We look to selector-liaisons to be aware of developments in technology and scholarly communication and to work to apply them with faculty and students in their assigned departments.

Two selector-liaison activities may be reasonably unique in the academic library environment, collaborative research and funding, and joint efforts to incorporate library instruction in the curriculum and specific courses. In the two years since the strategic plan has been implemented, selector-liaisons, working with the Grants and University Relations Officer and faculty in the departments, have prepared over five million dollars in joint research and demonstration proposals. Some of these proposals are now being funded, including a $450,000.00 grant from the National Endowment for the Humanities. We believe that there are many benefits to this collaborative proposal preparation, in addition to the money. First, by participating in proposal development, the library is involved from the beginning in new efforts for research, service, and instruction. By working with the departments closely and early, we are able to incorporate library services more quickly into the educational and research programs of the university. Second, collaboration has been effective in improving one on one relations with academic departments as teaching faculty become more aware of the particular strengths of the library and what the library can bring to academic department goals and initiatives.

Selector-liaisons are also active in the curriculum and course development. The Instructional Technology Assisted Learning program (ITAL) is a collaborative program intended to increase the use of information and instructional technologies in the classroom. Librarians provide about 25 percent of the curriculum support and regularly receive the highest evaluations in this program for NMSU faculty. From this venue and others frequently come requests on how to integrate electronic information more completely into new and revised curriculums. The selective liaisons have been very successful in participating in the development of new curricula and courses. In doing so, they are able to insert library and information resources in ways that lend themselves more fully to the accomplishment of library and university goals.

User-Focused Service Initiatives

The largest single effort to achieve our strategic plan has been devoted to Goal One -- to continue to develop a cooperative user-centered culture. The Library has embarked on an organization development program including job enrichment, training, and professional personnel support. All of these efforts are intended to empower employees to improve user services through direct initiative (Forsman, 1990).

We have also become more active in market research. One simple device that we are using with considerable success is a no agenda departmental meeting. In this case, the selector-liaison, one or more library department heads, and the deans meet with an academic department to discuss plans, needs, and concerns. Thus far, we have been meeting with four to six departments a year. We would like to extend that to ten so that we meet with each academic department once every four years. By having these informal meetings, we have been able to begin collaborative work on new curricula and research very early on. It also helps to put faces with names and gives a chance to praise those who have provided significant past service (Millson-Martula, 1995).

On a more empirical basis, we are collecting marketing information through telephone surveys, benchmarking, and best practices. By coordinating needs and best practices, we have been able to cut two days or about 15 percent on the delivery time for interlibrary loan. Perhaps more importantly, we have come to the decision to buy rather than to borrow materials in order to expedite delivery time. Both of these have been well received by our users who requested more than 24,000 items in the last year, ranking us number one among our peer institutions for interlibrary loan and document delivery.

To acquire knowledge and information resources to fulfill the university's land-grant mission, Strategic

Plan Goal Two, the library has been aggressively moving to electronic resources. In the last two years, we have added 3,922 electronic periodical titles. These titles have been identified by our liaison-selectors and acquired, often in collaboration with other regional universities and research institutions, through joint contracts with our vendors. In 1998, use of electronic resources, for the first time, exceeded use of printed periodical resources in the library. By having a firm grasp of the information needs of our faculty and students, the selector-liaisons have done an outstanding job in selecting and promoting the appropriate material (Hirshon, 1995; Townley, 1999).

By focusing on our users, we have also come to some decisions regarding the nature of the collection, in all formats at New Mexico State University. While NMSU itself is a major American research university with an emphasis on technology and agriculture, the University Library has never enjoyed an equivalent level of support. Given the incremental nature of change in academia, we can not expect to be a strong competitor for national research collections for some time to come. Instead, after considerable discussion and concentration, the Library has decided to focus on becoming a nationally recognized regional collection. We will acquire research level scholarly information and knowledge on topics of regional interest. By doing so, we plan to achieve national recognition in a limited area.

Frankly, it has been intellectually stimulating to attempt to define the nature of a regional collection. Certainly there is history and culture. But what do we do in the areas of science, technology and agriculture? We have decided to focus on important topics like water resources, astronomy, electrical and computer engineering, and other topics of particular interest in the American southwest and northern Mexico. We even seek to become the world's premiere repository of information on chili pepper (capsicum). Once again, this role feeds back into the liaison-selector role, particularly in funding. We are actively working with AGNIC, the U.S. National Agricultural Library electronic library program in two areas, capsicum and sustainable agriculture. We are making proposals to government agencies and private foundations to support our collections in this area and to organize them for national and international access.

The University Library has developed many new user-focused products, services, processes, and systems, Strategic Plan Goal Three. There is only space to mention a few in this paper. Last year, the Electronic Resources Librarian worked with the selector liaisons to revise library home pages. She provided advanced instruction in home page design and developed a number of templates for content. The liaison selectors brought an improved understanding of departmental goals, objectives and needs which was reflected in the content of the home pages. The result has been an 84 percent increase in use of library web pages.

In addition, the Access Services Department has developed interlibrary loan/document delivery request forms and makes them available on the library's home page and the library catalog. Faculty and graduate student users can fill out requests from their office or lab and the material is delivered to them regardless of its location. This service is very popular and responds to user needs by delivering information directly to the user so that we save their time for teaching and research. As a result of this initiative, document delivery increased by 227 percent in the past year.

Finally, we are providing an increased range of reference services in the library. Library technicians and other staff have been trained and are now providing a significant amount of support at the reference desk. This frees the selector-liaisons to spend more time with their departments, especially on research reference inquiries. An increasing number of these inquiries are received electronically at all hours of the day and night. They are being delivered to the appropriate expert for a response. Once again, the faculty and graduate students very much appreciate this convenience that takes advantage of asynchronous communication.

To develop instructional initiatives and programs that support the university mission, Goal Four, the

University Library has undertaken three significant initiatives. First, we are providing the Instructional Technology and Assisted Learning (ITAL) program along with the Computer Center and instructional technology unit. This is a 40-hour experience for faculty members who wish to obtain a grasp of instructional and information technologies and their potential for improving instruction throughout the university. The library provides about 25 percent of the instruction focusing on the acquisition and use of scholarly information in instruction. We regularly receive the highest evaluation of any component of the course. More important, we have now participated in the design or redesign of numerous courses in ways that enhance the use of scholarly information and library services.

In 1998, we began developing web-based instruction for students in freshman English courses. In the past, librarians undertook a coordinated assignment with English instructors in each class. We have now put this instructional unit on the web. We train the freshmen English instructors in its use and we monitor their outcomes. This relieves a great deal of time for the library faculty to involve themselves in higher-level instruction and the other activities of being selector liaisons.

We also teach a three-credit course on information literacy. This course focuses on providing lifelong learning skills to undergraduates. We attempt to teach them how to acquire and use scholarly information in their particular discipline. The course is part of the University's general education curriculum and is very popular. The three sections offered each semester are always full.

In providing the means and infrastructure for the management and distribution of scholarly information, Goal Five, the library has made significant advances in several areas. We have provided significant leadership in developing our knowledge infrastructure. In 1997, the library provided a citation-based impact analysis using Institute for Scientific Information (ISI) data for all departments. Several departments in the College of Engineering met with the library to discuss how to increase the impact of their publications. The result of this collaboration has been an improvement in the publications of the College of Engineering and their placement in scholarly journals. This in turn has resulted in New Mexico State University being named number two in the 1999 ISI impact study regarding their publications. Only Indiana University exceeds the impact of New Mexico State University in the quality of its engineering publications – at least for 1999.

We have also been active in promoting the role of libraries in scholarly communication. Last year, we co-sponsored a highly successful symposium on Computer Law attended by more than 100 faculty and professional staff. We regularly work with the instructional technology unit to deliver outside training on the use of information and technology.

And perhaps, most importantly, we have become active collaborators in the development of proposals for research and service. We almost always work with faculty in academic departments to create joint projects and proposals. In doing so, we serve ourselves as we serve others.

Challenges

No strategic plan is perfect. And we have our share of challenges. Many of these derive from our successes. Library efforts to improve our relationships with academic departments may have weakened our common programs in part. For example, I am convinced that our undergraduate collection does not receive adequate attention. As a result, a librarian has been appointed to coordinate the core collection, which consists of materials that are heavily used for undergraduate instruction.

We also had a fling with team based management following the lead of our nearby sister institution, the University of Arizona. After two years, we have concluded that while teamwork and collaboration are critical to the success of our strategic plan, team based management is not. The department that tried to do this most extensively has returned to a traditional organizational structure (Bender, 1997).

The most vexing problem remains on how to encourage flexibility, quick responsiveness and creative dissent while at the same time maintaining a common strategic direction. The solution to this continues to evade us, in part, despite the dedication of significant resources towards its resolution. When tempers get short and egos are on the line, we encourage everyone to focus on the strategic thrusts that we adopted in the Library Strategic Plan:

- User-focus drives decisions.
- Cooperative philosophy creates a responsive and flexible organization.
- Appropriate technology serves the user.
- Collaboration fuels development.
- Risk-taking and leadership at all levels inspire innovation.
- Teaching and outreach cultivate information/knowledge consumers.

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IATUL

THE FUTURE OF ACADEMIC LIBRARIES AND CHANGING USER NEEDS: GENERAL CONCEPTS AND CONCRETE DEVELOPMENTS

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Introduction

Academic libraries operate within changing academic environments. Academic environments change partly as a consequence of developments in information and communication and partly because of developments in the practice of science. These developments are pushed by societal and technological factors, for instance the increasing influence of market mechanisms and the evolution of information and communication technology (ICT).

The need for change in academic libraries often seems to be pushed more by ICT-developments than by user needs in the context of changing academic circumstances. Academic libraries have to function primarily as service oriented, stimulating institutes supporting academic processes. They are not expected to push changes in the academic environment. Therefore one should expect changing user needs to be a main factor in the development of academic libraries.

This paper concentrates on the responsiveness of libraries to user needs within the context of a changing academic environment. First the character of the changes in the academic environment and the consequences of them for the relation between scientific information and users will be elaborated. Then the kinds of responses needed for the adequate support of scientific practices by academic libraries are discussed and illustrated with some experiences in the University Library Twente. Finally some concluding statements for discussion are presented.

The changing academic environment

In this paper the concept of academic environment is identical to the university and used for those scientific arenas which are characterized by the combination, and often interrelation, of scientific research and scientific education. Changes in the academic environment are affected by the development of science in general.

Changes in science

The development of science has been analysed by many scholars, for example recently by Ziman (1994) [10] and Gibbons et al. (1994) [2]. These authors notice a change in science due to internal dynamics like the steady growth of knowledge production, increasing interdisciplinarity, increasing attention for applied sciences, networking and internationalisation. These changes have been verified and roughly confirmed by means of bibliometric analysis (Hicks and Katz, 1996) [4]. However, the work of Gibbons et al. [2], about a new mode of knowledge production, has been critisized by Godin (1998) [3]. He presents evidence for a lack of empirical validation of the supposed new mode of knowledge production.

Nevertheless, there seems to be consensus about the phenomenon of a growing heterogeneity in actors involved in science. Rip argues that in many sciences there is a trend of broadening the scientific audience across the traditional boundaries of disciplines and academic environment, for example by bureaus, consultancies and policy-makers (1995:85) [8].

Furthermore most authors witness a development in science characterized by a shift to so-called strategic research. Roosendaal and Geurts notice a shift to strategic research characterized by more selectivity along societal priorities and strict research plans and programmes. Driving force is the scarcity in research resources demanding "research breakthroughs within an acceptable time horizon" (1998:5) [9]. According to the authors of this paper, this might lead to a priority for short-term research and an underestimation of 'curiosity' as an important driving force in scientific advancement. Ziman argues that strategic research combines short-term research purposes with "a more general strategy of undertaking more basic research with wider, longer-term goals" (1994:31) [10]. According to Godin this does not mean that strategic research programmes are always socially accountable (1998:478) [3].

Changes in academic research and education

Universities are unique because they are scientific institutions where research is combined with education. Academic education is considered to be part of the advancement of knowledge. Therefore the academic environment needs a norm of openness with respect to research results while other scientific institutions are generally more prudent in communicating outcomes of their scientific work (Ziman 1994:39-40) [10]. Boyer (1990) [1] distinguishes four key roles of the university: scholarship of teaching, scholarship of discovery, scholarship of application and scholarship of integration of scientific knowledge. Johnston (1998:269) [5] maintains that all these scholarships are the core business of universities, although emphasis shifts as appropriate to meet the needs of the times. One should be aware of the relation between these roles in order to guarantee both flexibility and continuity of the university. Science and, more specific, academic research changes within a context of societal and technological developments. Government policies with respect to science funding, for example, forces universities to collaborate with other institutions, which stimulates heterogeneity in actors involved in science. Reduced public funding for scientific and/or academic research makes universities more dependent of resources from and collaboration with market-oriented parties. At the same time increasing collaboration and heterogeneity is facilitated by advanced information and communication technology. Like in academic research, in academic education changes can be witnessed because of societal and technological developments. Labour market developments nowadays demand core competences, lifelong learning, et cetera, while reduced public resources for higher education creates a need for efficiency and, consequently, a strict organization, control and monitoring of academic education processes. At the same time ICT offers good prospects for new modalities of realising education, thus enabling learning instead of teaching. Scientific communication and user needs Line (1996) [7] indicates that boundaries between actors involved with using, producing, publishing and distributing information become fluid because of changes in academic research and education. Consequently, academic libraries as actors in the process of scientific communication, are confronted with an increased capacity of the private sector to work in the same field. Individuals are able to bypass traditional actors like libraries and publishers. Thus new checks and balances develop in processes of scientific communication.

University libraries have an important supportive role in both, educational and research processes. Kuhlthau (1993) [6] for example argues that this role not only consists of providing just in time access and delivery of information, but also of facilitating problem solving. Kuhlthau sees searching information as "a process of construction from uncertainty to understanding". In this process she distinguishes cognitive, affective and operational aspects and concepts which should be taken into account when providing information services. So far there seems not to be very much research dealing with these psychological aspects of users' information processes. Nevertheless in the development of modern tools for supporting users increasing attention for 'user psychological aspects' can be recognised.

Academic libraries have to provide information services for users acting in an academic environment which is characterized by increasing collaboration and heterogeneity of scientific actors. To get a more detailed picture of actual and future user needs, research has to be carried out on the process of scientific communication in the context of academic research and education. As an essential part of this kind of research special attention has to be paid to different aspects of user behaviour and user needs regarding information, including psychological aspects.

The University Library Twente has the intention to initiate a research programme on scientific communication. At the moment the University Library Twente is carrying out different types of projects on user needs concerning information. Some experiences will be described in the following section.

Responding to changing relationships between scientific information and users

Traditionally researchers have a rather 'indirect' relationship with scientific information. As producers and users of information they used to need the assistance of intermediaries in the form of publishers, libraries etc. Nowadays their relationship with scientific information changes into a more 'direct' one due to especially developments in ICT. As producers and users of scientific information researchers can operate more independent from intermediaries although intermediaries can still be of value in facilitating scientific communication.

Students traditionally have a 'direct' relationship with teachers as leaders of learning processes in more or less linear organised instructional environments. Due to societal and technological developments traditional teaching changes increasingly in creating (tele)learning environments. Students participate in flexible learning processes via more 'indirect' contacts with teachers and facilities, including scientific information. Teachers no longer lead instruction, they facilitate learning.

These changes require new challenging roles and skills not only for students, teachers and researchers but also for others facilitating scientific learning and research like academic libraries.

The challenges for academic libraries are threefold: a. offering user-friendly ICT-oriented facilities (like remote access to information and services), b. estimating changing user needs and c. supporting users in new academic environments. These items affect all users of scientific information. For example researchers in coping with topics like copyright, teachers in organising new (ICT-oriented) learning environments and students in getting more responsibility for their own learning processes including the development of adequate information skills. The topics mentioned above will be elaborated, referring to projects of the University Library Twente.

Offering remote access to a variety of information, not only in libraries but also worldwide via databases, homepages with selected Internetsites and the like, attracts much attention from librarians. Most of this attention is still technology driven. Many of such new facilities are less used than expected and/or hoped for. This can for example be illustrated with experiences with the 'profile-form' (see later). Reasons for this situation have to be sought in the direction of too little attention for user friendliness from the perspective of the users of information, too little attention for the responsiveness of facilities to user needs and inadequate public relations and marketing. This topic will not further be elaborated here as the main interest is not in ICT but in user needs.

Estimating user needs deserves more attention than it often gets. Too often statements on user needs are based on suppositions of providers of information services instead of on empirical information. Much more observation, monitoring and research is needed regarding the behaviour and needs of users of information. Therefore some initiatives on getting to know more about user needs are tried out in the University Library Twente.

Two projects on *registering users' questions* are realised. The questions raised are registered by members of the library staff. Such registrations are only indicative as, due to daily work stress, probably not all questions were noted down and mistakes were easily made. Furthermore it was a new experience for staff members to register questions. Nevertheless both registrations of questions resulted in useful indications.

The first one, lasting three months and held in 1996, aimed at getting insight in the character of users' questions and at knowing how adequate questions of users are dealt with in the University Library Twente. About 40 per cent of the questions appeared to have a general character and are expected to be solved by means of PR-leaflets and signposting. About 90 per cent of all questions could be overcome adequately without reference to a colleague staff member.

The second registration of questions is realised in 1998 and lasted also three months. This time the aim was to register users' questions about specific products and services of the library. It served as a preliminary investigation to a more thorough research on user needs. The following conclusions should be regarded as very indicative. Users noticed some user unfriendly facilities in the Online Library and Information System and some technical imperfections when using CD-rom's in the universities' network. Regarding library services users want more and cheaper lending facilities, less complicated shelving numbers, longer opening hours, and more study rooms and computers.

For the Faculty of Educational Technology of the University of Twente a *self-diagnostic 'profile form'* has been developed in which users express the state of the art of their information skills as well as their information needs. The profile-form is a questionnaire consisting of four categories of key-questions dealing with what respondents know, what they think they are able to do, what they actually do and what they wish (see box 1). The questions are closely interrelated and each answer has a score. After filling in the form, the user can immediately get a total score indicating his or her level of information skills. The outcomes can also be presented graphically. Based on the total score the user and, when involved, also the information specialist, knows whether support on information skills is needed. Based on the score per category of questions it is possible to support only on those aspects which require attention. Putting together scores of groups of users provides a basis for developing services fitting with user needs. So this self-diagnostic tool can be used individually as well as for groups of users and gives insight in information skills as well as in information needs.

BOX 1: The self-diagnostic 'profile form'
(In this example only one question per category is shown)

(question)	**(score)**	**(answer)**
Did you know... ... it is possible to realise a personal SDI?	1 2 3	no, never done I think so yes, practised
Do you have ... ... a SDI in international databases?	1 2	yes no
Do you wish ... ... to be alerted on new publications of your interest?	0 0 0	is already realised no need for yes, please

Recently some *focusgroup discussions* were organised with students, teachers and information specialists of the University of Twente. The topic was: What is needed to stimulate and support the use of scientific information in academic learning processes? The outcomes show unanimously that the response to user needs is not optimal with the current (organisation of) provisions and learning processes as far as coping with scientific information is concerned. Three main areas of dissatisfaction can be distinguished: lack of up to date information skills, lack of integration of training and assessment of information skills throughout the curriculum, and lack of (knowledge of) facilities, sources etc. Such outcomes require innovative activities of both the academic library and the departments of the university concerning for example:

- the development of self-instructional materials to be used just in time for updating information skills,
- the adjustment of the organisation of the curriculum and support for teachers, and
- the enhancement of lively demonstrations.

Supporting users in new contexts requires more conceptual and psychological thinking than libraries are used to do (see for example Kuhlthau). This is very obviously the case with some self-instructional materials developed by the University Library Twente in cooperation with the Faculty of Educational Technology. These self-instructional materials are based on minimalistic principles, thus offering very condensed and user-friendly instruction in using databases. Within about 15 minutes the user is equiped properly to use the sources concerned efficiently.

Another form of supporting users in new contexts is the MEEWIZ-programme. In English it is called SESSION: Systematic and Efficient Searching of Scientific InformatiON. It is a *training programme* for the development of information skills. The programme can be used as self-instruction, but also for remote or tele-learning embedded in a discipline-oriented curriculum. It is offered via the web and consists of five modules (1: problem statement, 2: referring sources, 3: search techniques, 4: informative sources, 5: information management). Each module contains interactive instruction, exercises, illustrative examples, links if opportune, syllabus texts and possibilities for coping with ones' own topic as much as possible. The modules can be followed either seperately or as a complete course. The programme has an administrative system providing opportunities for monitoring the learning process and for getting ones' own answers back when restarting the programme.

BOX 2: Overview of self-instructing training programme SESSION
(The numbers refer to the numbers of the modules in the programme)

phases in the search process	**techniques**
formulating the problem and orienting on it	formulating the problem (1) orientation (2 and 4)
developing and planning the search strategy	selecting: referring sources (2) terms (3) organising the search process (5)
realising the systematic search and managing the results	searching referring sources (3) information management (5) kinds of informative sources (4)
evaluating the search process and its results	evaluating sources (5)

The projects of the University Library Twente presented in this paper enhance responsiveness to changes in sceintific communication. However, they should be regarded as start. In general university libraries have to develop knowledge on changes in scientific processes and communication on a longer term in order to safeguard or strengthen their position within the academic world.

By way of conclusion: statements for discussion

1. In the changing scientific environment the traditional academic freedom can be restricted by market forces and enlarged by ICT-developments.
2. Although users of scientific information become technically increasingly independent of intermediaries, for reasons of efficiency they need new facilities and forms of support offered by, for example, academic libraries.
3. Academic libraries are not meant to pull developments in scientific processes. They are expected to develop innovative facilities and forms of support to facilitate the scientific process.
4. Adjustments of the supportive role of academic libraries can better be pushed by user needs than by technology (although academic libraries should take as much advantage of ICT-developments as possible).
5. Responsiveness to user needs requires continuous observation and monitoring of the information behaviour of users. Research on, development of and experiments with advanced techniques for doing so are desperately needed.
6. Library staff in academic libraries needs not only professional information skills but also didactic and research skills in order to facilitate and support future scientific processes adequately.

By the way, the authors of this paper experience their own behaviour as inconsistent when alternating their role of information service provider and information service user.

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IATUL

Educational needs of Finnish polytechnic librarians

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Introduction

Since the beginning of the Information Age, Finland has been in the front line of applying new technology in libraries. Changes in the field of education have also affected the libraries. New concepts of knowledge and learning, in particular, have called for substantial improvement in integrating library and information services into learning and teaching and curricula. These, together with the polytechnic initiative or experiment, have meant many challenges for Finnish polytechnic librarians in recent years. However, no research has been done on the new competencies and skills the librarians need in new learning environments. This article reports a study carried out in order to identify the educational needs of the library staff of Finnish polytechnics. [1]

The Finnish polytechnic system

The polytechnics are the newest part of the Finnish system of higher education. This educational reform started in 1991 with the launching of 22 experimental polytechnics, which were built on former vocational colleges and institutes. The aim of the polytechnic reform was to create a non-university sector, which is more practically and professionally oriented, to raise the standard of higher vocational studies, to provide better linkage or combination between vocational education and working life and to respond to changing needs for expertise and skills needed in working life. Now 32 polytechnics are offering polytechnic degrees (bachelor) in seven disciplines (e.g. engineering, business, art and design, health care and social services) for students who have passed the matriculation examination or who have a basic vocational qualification. Most polytechnics are multidisciplinary.

The whole polytechnic system is being developed on the basis of systematic monitoring and evaluation of its activities. Staff development and library and information services were both targets selected for the evaluation. [2]

At the beginning of the experiment the library services of many polytechnics were insufficient for higher education, and they often had no professional librarians. The international evaluation of two Finnish polytechnics (North Karelia and Kemi-Tornio), which was carried out in 1994 and 1996, reported that there were not many signs of a systematic approach to creating for learning resources centres. [3]

Since then, many signs of such an approach have become visible. The polytechnic libraries are still small, but they are currently experiencing a dynamic stage of development. New services and collections have been developed, and the polytechnic libraries are becoming important parts of the Finnish library network. They house about 1.7 million books, mainly new ones, and the total staff numbers about 230.

The work in polytechnic libraries is challenging. The librarians have met new initiatives alongside establishing the services for new organisations, e.g. teaching of information skills has become more important. It is evident that the librarians need new competencies to keep pace with change and to meet the needs of their new role in supporting self-directed learners (self-directed learning is one of the stated educational goals of the polytechnics). How capable is the library staff of meeting these new challenges? Do they feel lacking competence? What educational needs does this reform bring up?

In Finland these problems had not been studied as they have in many other countries.. In the previous IFLA round table meeting (Copenhagen 1997) on continuing professional education for the library and information professionals many experts were talking about the need to improve our teaching skills, our educational credibility and our ability to build partnership with teachers or the faculty. [4] The Rectors' Conference of Finnish Polytechnics ARENE was willing to study the educational needs of the polytechnic library staff, and three librarians (Widenius, Viiri, Tahvanainen) belonging to the ARENE Library and Information Services Group were given this task.

The aim of the study

Our aim was to identify the educational needs. This identification would then be used for planning continuing professional education and training suited to their particular needs. We decided to concentrate on the personal development and learning needs identified by the library staff and wanted to ascertain:

- needs for both vocational and academic education in librarianship
- needs for continuing professional education and in-service training
- needs for leadership and management education
- needs for post-graduate/doctoral studies

We did a nationwide questionnaire that could be answered by mail or via Internet. The questionnaire consisted mainly of structured questions but the respondents were also encouraged to express opinions and feelings concerning the issues asked. In the questionnaire the topics of possible or predicted educational interest or need were grouped into four main themes (See Table 1).

Table 1. Educational themes and topics offered

Library work	Leadership & management	Information technology	Learning & learning environment
collection development, indexing &cataloguing, customer services, information skills & resources language skills	economics & funding leadership & development work, project & team work library as part of polytechnic information management, quality issues marketing & communication	basic IT skills, networks, digital libraries, software	learning organisation, adults as learners, learning environment, pedagogy and training skills, collaboration with degree programmes

The respondents were told to choose not more than ten topics they felt were important for themselves.

We received replies from 175 respondents at 27 polytechnics. The total number of the library staff at that time was 183, so the response rate was 96 %. The respondents were librarians, information specialists, library directors, library assistants and information service secretaries. Half of them had an academic background (81 % in library and information science) and the other half had a vocational education background (mostly commercial college education for library assistants).

Topics of interest most commonly chosen by the library staff

Most members of the library staff felt they needed to learn more about how to teach information skills, how to integrate libraries into the context of polytechnic information management and how to use information networks effectively. About 70 % of the respondents were interested in learning more about these three topics. Evidently the respondents have understood the pedagogical meaning of the library. The design of the learning environment was recognised as an educational interest by half of them (53 %) and they wanted to improve teaching and training skills (53 %). The topics chosen most often are shown in Table 2.

Table 2. Topics most commonly chosen

Topic	**Percentage of respondents**
information skills	74
library as part of polytechnic information management	70
information networks	69
learning environment design	53
pedagogical & training skills	53
language skills	53

Differences between academics and assistants

We compared the needs identified by qualified librarians and by those with vocational educational background. As could be predicted these groups had slightly different needs, but the differences were rather small. For example, the topics thought to be especially interesting to those in charge of the library services also interested the library assistants. The reason for this might be that everybody working in a polytechnic library has to do almost everything. The staff member of a polytechnic library often operates as a solo librarian and has to be multi-skilled.

The academics were more interested in information skills, apparently because they are teaching them. And as they are in charge of the libraries, they also wanted to know more about the library's role in information management of the polytechnic. They do not want to develop their libraries as separate islands in the polytechnic. Planning of digital libraries is also one of their challenges. In recent years there has been a shift in librarian's work towards tutoring, teaching and consulting. Therefore pedagogical and training skills and learning environmental design were found interesting. On the other hand, they felt no need to update their library skills, as the assistants did.

Two things about the needs of the qualified librarians were unexpected. First, we assumed that they would find learning more about economics and funding to be important and useful, as these are essential parts of the library director's work. However, money seems not to interest them. The reason might possibly be because they do not have real economical responsibility. Second, if self-evaluation and internal evaluations are so important and crucial for the polytechnics, how will the polytechnic libraries evaluate themselves when only 1/5 are interested in quality work?

Compared with the academics, the assistants were more interested in obtaining better language skills and taking language lessons, which is quite understandable in light of their educational background. Since their establishment, the polytechnics have experienced rapid and large-scale internationalisation. Now they are receiving more foreign students every year and customer services can no longer be managed without the ability to communicate in foreign languages. The assistants also wanted to know more about marketing and library work.

Information technology no more makes library staff feel uncomfortable. On the whole, the respondents felt they had enough basic skills in information technology. Among those with the academic background the digital libraries are recognised as part of the future possibilities. Networks, the internet and its overwhelming resources are used daily and are still considered interesting and worth becoming better acquainted with.

Preferred organisation of learning opportunities - "Anything goes if it will make me more competent in my work"
We also wanted to find out what were the preferred styles of learning and methods of teaching. How did they feel about classroom teaching, taking study modules, attending courses or distance learning?

It can be assumed that those practising a profession are not so eager to become full time students, but are most probably interested in continuing professional education. That was also the case here. Almost 80 % of the respondents wanted such studies. Interesting enough, about 40 % were degree- or diploma-oriented, stating that setting a goal for oneself is a matter of motivation.

The type of learning these respondents quite clearly preferred is open and flexible learning and multiform teaching. The respondents are ready to spend evenings and weekends on their studies and are willing to have distance modules, learning in teams and in projects, and they are ready to use networks for their learning.

How could their needs be met?
What could be done to respond to the needs of the library staff? There seem to be some needs for improvement in library education, professional development studies, doctoral studies and in methods of instruction. Our suggestions are:

Library education in Finland is now based mainly on university studies. The University of Tampere, which has the oldest Department of Information studies, offers a M.Soc.Sci. programme. Librarianship can also be studied at Oulu and Turku Universities. These universities all educate academic information professionals and librarians. There seems, however, to be *a need for a vocational degree programme for library assistants*. Some years ago vocational education for library assistants was available in many commercial colleges, but that programme no longer exists. There is also a need for advanced professional studies in librarianship offered by the polytechnics. This would serve the needs of the assistants with the commercial college background.

In many countries, universities offer special *courses or programmes for school librarians or teacher librarians*. The possibilities of having such programme at some university in Finland should be studied. *Tailored PD (professional development)-studies*, especially in the field of pedagogical and training skills, should be offered by universities or academic centres of further education. These organisations could offer *leadership and management education and training courses*, which would meet the needs of other library directors.

Many of the respondents were already doing post-graduate studies at different universities. As most of them are carrying out research on topics related to polytechnic libraries, it would be rational to organise *a doctoral programme* for them. The polytechnic system would benefit from research done in that programme, and the students in that programme would benefit from their peers and from sharing the same research interest with others.

In custom-designed higher education the emphasis should be on integrating libraries into learning and on creating readiness for developing services and products, change management and knowledge management. All studies should be organised in real interaction with working life. Students should have individualised curricula, where former studies and work experience are taken into account. *New learning and teaching methods* should be applied, because for librarians it would be useful to gain first-hand experience of new learning styles and teaching methods applied at the polytechnics. Knowing and understanding those methods would help the librarians to help their customers.

Apprenticeship should be developed as means of entering the library world. Academic apprenticeship could be one way to recruit new people with thorough knowledge of a particular subject-area (e.g. engineering) to work in polytechnic libraries.

Information technology is no longer making librarians feel uncomfortable. The respondents feel they have no problems with Word, Excel, PowerPoint etc. but they want to learn more about the networks. They are interested in the contents, not in the technology. As it seems that polytechnic libraries are not well enough integrated into polytechnic information management, continuing education and training in information technology and management could be offered to ADP professionals and library professionals together. They should plan and manage the information resources of the whole polytechnic collaboratively.

Conclusions

According to these results, the library staff of Finnish polytechnics have many different educational needs. The staff is willing to gain both new personal and professional competence. It was found that they want to learn:

- to teach,
- to relate library and information services to the polytechnic education, organisational mission and strategies
- to exploit networks effectively
- to speak foreign languages

It is also obvious that they want to learn in a new way, by new methods. Universities, polytechnics and other organisers of education have a mission to provide educational opportunities, and to develop and offer tailored education that could serve their needs.

It is also obvious that research on future learning needs of the librarians and the changing role of the librarian is needed. In my ongoing research I am concentrating on pedagogical librarianship which I understand as librarianship (library & information services, the work of the library professionals)

- integrated into teaching and learning, curricula and learning environment
- supporting open and flexible learning
- meeting the needs of the learners
- part of the learning organisation
- form of expertise

The purpose of that study is to define **1.** what is the future pedagogical role of the Finnish polytechnic librarian, **2.** what is the new expertise they need and **3.** what is their consensus about needed pedagogical skills and competencies. The views concerning pedagogical librarianship are studied using the Delphi method (rounds of responses by experts moving towards consensus). I hope my results will clarify librarians' and library services' pedagogical role and their contribution to teaching and learning and will help in building partnerships with teachers. I think that we who are working in learning organisations must have a pedagogical approach to our profession. I believe that if the librarian understands the pedagogical possibilities of his/her work, and if the organisation and the teachers do, the work of the library and information services does have an impact on learning outcomes and on the quality of the education"

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I certify that this paper is original and has not been copied from, or published, elsewhere.

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IATUL

INNOVATION AND CHANGE IN PROFESSIONAL PRACTICE: MEANING TO CHANGE AND CHANGING THE MEANING

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Introduction

The paper is about innovation and the change triggered by the introduction of new approaches to planned change in professional practice. In particular, it presents a range of ideas and theories about innovation and change and speculates about how new approaches get introduced and become accepted into our professional practice. The paper concludes by focusing on the nature and characteristics of change and some theories that might help us to better understand and manage change both within the context of individual libraries and across university libraries generally.

While somewhat theoretical, the ideas presented come directly from education theories that are being applied to case-study research underway in Australia [1]. This research is examining in detail how staff in one Australian university library responded over the period of 1992-1997 to changing times by systematically planning to change their professional practice. In essence, the case study looks at how the staff were meaning to change their professional practice through the innovation of strategic planning and how they used a strategic planning process to drive and change the meaning of their professional practice. In the context of the research, strategic planning is viewed as both educational innovation and driver of change in professional practice and as such strategic planning is both the subject and object of the research.

The specific detail of the LIS case study will be reported later in the final research report and the professional literature. For this Conference presentation, I want to draw on some of the educational theories about innovation and change which underpin the research to help us focus on the conference themes and to better understand and respond to the changing environment in which we operate. A similar approach has been used previously to understand innovation in public libraries in the United States [2].

Changed circumstances for professional practice

As professional practitioners, educators and information managers, working in technological university libraries worldwide, we work in a volatile world and we are constantly reminded that change is something that we had better get used to. Our daily working lives are surrounded by constant reminders that change is upon us.

We are all well acquainted with the fundamental drivers of change and we appreciate that the pace of change is rapid. The underlying economic, technological, political and social factors driving change are well known to us because as people living and working into the 21st century we have personally experienced the impact of many of these changes. I have worked in the libraries of academic institutions for some 20 years. I remember well the dramatic changes brought to our professional practice by the introduction of automated methods of cataloguing. In years ahead I'm sure we will also reflect on the amazing changes brought to our professional practice by the arrival of the Internet.

Global developments in information technology have revolutionised communications worldwide. The information age is upon us, the rate and volume of published materials has exploded and the nature and process of scholarly communication and publishing in the electronic age has been fundamentally altered. Governments worldwide have vigorously pursued economic reform agendas for change and demanded of universities worldwide a greater level of efficiency and accountability for the public monies, which they bestow upon us in the form of operating grants. All of the global impacts have affected universities and nowhere more so than in university libraries where many of these factors converge in a quite dramatic way. Frequently local geographic and institutional specific factors and agendas compound them. University libraries are often a microcosm reflecting the diverse range of change forces at work in universities, in education and in the world at large.

Regardless, many of us would not have predicted the overwhelming rate at which change is happening. Few still have had the time or the opportunity to reflect on the processes which drive change and so we are left as practitioners to invent our own reactions and to struggle to lead our staff through what can often be a somewhat threatening time.

Change is a phenomenon in our working lives and it is important for us to comprehend this phenomenon and know best how to manage it within our individual workplaces and across the sector generally. Conferences such as IATUL are an important way for us to share professional practice. But so too is applied research which seeks a deeper understanding and knowledge about the forces at work in shaping and changing our professional practice.

Innovation, change and strategic planning

Innovation has been defined as an object, idea, policy or practice that is perceived to be new and which triggers change [3]. An important feature of innovation is that it is perceived as novel whether it is new, or not. For example, the LIS strategic planning process as it was introduced in 1992 was an innovation in the sense that it was a process and approach to the planning of library services, which the LIS staff perceived as something new. It was novel to them and in adopting a formal strategic planning approach into their professional practice, LIS staff triggered change within their organisation. They were not only responding to a changing environment, they were now actively planning to change their professional practice.

In the organisational context, organisations do not need to create or invent the new idea to be considered innovative. However, the idea does have to represent a significant departure from the organisation's own tradition if it is to be viewed as an innovative organisation. For example, the LIS did not create or invent strategic planning but its introduction into their professional practice represented a significant departure from its previous traditions and approaches to planning library services. In particular, LIS staff has not previously set out to review the environment in which they operated, they did not have a formal mission statement, they had not systematically consulted clients about service development or delivery and they had no obvious quality management framework in place.

A significant distinction between the organisation that changes and the one that innovates is related to the timing involved. For example, the innovative library will be an originator or a very early adopter of a new idea, and therefore would be considered a leader with respect to whatever specific changes occur. For example, at the time the LIS staff moved to adopt strategic planning it was not an accepted part of the general planning and management practices of Curtin University of Technology, nor was it in widespread use in Australian universities. LIS staff were therefore early adopters. At this stage it is interesting to think about your list own list of innovative libraries.

Innovation should not be confused with invention, although the two are clearly related. Innovation and change are inextricably linked and are sometimes used interchangeably. Change brings with it various dimensions including rate (speed), scale (size), degree (thoroughness), continuity (profoundness) and direction. Change is a process, which generally takes place over time. Sometimes the process of going through the change is as significant as the change itself.

Strategic planning has been defined as a process of continual planning for change, which assesses an organisation's or program's internal and external environment, analyses the implications of relevant trends, and identifies effective strategies for achieving a desired future state [4]. Undertaking this process led the LIS staff to systematically and deliberately plan to change their professional practice. They summarised the change as moving away from being a passive repository of information towards that of being a proactive, dynamic, client-focussed information service. This change represented a move away from information collection (just in case) to provider of access to scholarly information, regardless of location and/or format (just in time).

Strategic planning had its origins in the military world and has been extensively used in the business and commercial world. Strategic planning, as an indexing term in ERIC, was first used in 1993. Nevertheless, the term strategic planning was in use in the education literature well before 1993, having first appeared in the early 1980s.

In relation to strategic planning in the educational setting of university libraries, a prominent early author on this topic was Donald E. Riggs [5]. Riggs, who was in the early 1980s then Director of University Libraries at the Arizona State University (ASU) was one of the first library managers to apply the principles of strategic planning to the professional practice of a large university library. His early writing and his work at ASU provided the foundations for his major writing on the topic [6]. Riggs continues to influence the literature and the professional practice of librarians, especially those working in university libraries. Riggs is also well cited by other authors on the subject of strategic planning in libraries during the latter half of the 1980's and 1990's.

During the second half of the 1980's, the concept of strategic planning in libraries began to emerge in a small number of articles in the literature about Australian libraries. These reports largely centred on a discussion of models of strategic planning and the use of library service surveys to inform the strategic planning process. For example, one of the earliest cases reported was about the use of strategic planning concepts to assist with the development of the library building and services at the new Parliament House complex in Canberra [7]. Other cases reported around this time included the use of strategic planning concepts in an academic library [8] and a medical library [9].

By the later half of the 1990's, the literature has many examples of strategic planning in academic libraries. Indeed, Bundy suggests that Australian university libraries have quickly developed sophisticated approaches to strategic planning and client focused performance and its measurement, often ahead of their parent communities [10]. Many of the examples appearing in literature during this period are grounded in corporate managerialism and the need for change management. At this time also, public relations begins to emerge as a core part of the strategic planning cycle. During the first half of the 1990's the emphasis is on flexibility in strategic planning and the use of technology to assist the process. It also becomes linked to performance, whether this is performance-based reward, or performance measurement and review.

In the library literature during the latter half of the 1990's the term strategic planning becomes mixed with Total Quality Management (TQM) and Total Quality Service (TQS). Particular examples of the application of strategic planning in libraries become common in the literature. There is an increased emphasis on a participatory model of strategic planning and the focus is often on the use of teams and group decision making as a tool in strategic planning.

Finally in relation to strategic planning and libraries, a review of the research available through *Dissertation Abstracts* found the earliest occurrence of a master or doctoral thesis that included the term strategic planning in academic libraries were both in 1986. [11, 12]

The research-in-progress

My research interest in how innovation gets introduced, implemented and institutionalised into our professional practice as librarians and how we can best manage change triggered by innovation comes directly from the situation we had been working through at the LIS.

However, we had been so busy reacting to the very complex and changing environment in which we found ourselves operating that we did not have time to adequately reflect on what was taking place in our professional practice. Therefore, the research-in-progress is designed to do exactly that: to look retrospectively at the staff experiences of innovation and change, through their strategic planning process, over the period from 1992 to 1997.

In 1992 the LIS staff deliberately set out to use the innovation of strategic planning to trigger change in their professional practice and to drive change within their organisation. LIS staff used a strategic planning process to:

- respond to the changing role of the library and redefine their mission
- respond to the changing role of the library and develop new organisational structures and methodologies
- focus on users and become a client-centred library
- give attention to staff development and participation
- ensure quality management principles became integral to the planning and management of service delivery.

My general pondering and research about innovation and change is therefore fundamental to some of the questions presented by the Conference organisers and which we will focus on during our deliberations at this Conferences. These include:

- What is our vision for technological university libraries?
- How does the changing role of libraries influence our professional practice?
- What new processes and practices do we need to put in place in order to achieve our vision for technological university libraries?
- How can we ensure that our professional practice is responsive to client needs?
- As professional practitioners and managers working in the 21st century what are the defining competencies and attitudes required by library staff?
- What processes and systems do we need to put in place to monitor our progress and to effectively respond to changing circumstances?

These Conference focus questions are not dissimilar to the questions being addressed by the LIS case study research. These are:

- What key organisational factors and processes help to ensure successful educational innovation and strategic change in professional practice?
- What are the nature and characteristics of the strategic planning process?
- Within a strategic planning process how critical is the articulation of a shared vision and values for driving the innovation and strategic change?
- What particular processes help to ensure a shared vision and values?
- To what extent does the adoption of a strategic planning process contribute to successful innovation and the achievement of strategic change?

Change theories

The literature on educational change offers us some insights into the nature of change. This literature is vast, especially that covering the implementation of specific curriculum, technological and other forms of classroom and administrative innovation. The literature about change and its management in organisational contexts is also expansive and frequently this literature crosses discipline boundaries. For example, a predominance of recent publications has emerged through the literature of business management, highlighting the experiences of the business and corporate sector. Concepts of economic rationalism and corporate managerialism are gradually finding their way into the educational domain and are emerging as a force behind the structural reform movement in education.

Reviewing educational literature over a 30-year period, identified three influential perspectives in education change [13]: These were:

- The rational-scientific perspective (or the R & D approach) that change is created by the dissemination of innovative techniques.
- The political perspective (or the top-down approach) bringing about change through legislative and other external directives.
- The cultural perspective (or the bottom-up approach) seeking to influence change through encouraging value changes within organisations.

In noting how far the study of educational change has come during its 30-year history, Fullan has suggested that we may be at the beginning of a new phase in how we think and act in relation to change. He describes this new phase as a quantum leap or a paradigm breakthrough. He uses Pascale's observation that productive change roams somewhere between overcontrol and chaos to describe how this new phase of change presents itself [14].

Fullan has much to say about the nature of the change process, but what is important for us as professional practitioners are his eight basic lessons of the new paradigm of change. These are:

Lesson 1: You can't mandate what matters.
The more complex the change the less you can force it.

Lesson 2: Change is a journey not a blueprint.
Change is non-liner, loaded with uncertainty and excitement and sometimes perverse.

Lesson 3: Problems are our friends.
Problems are inevitable and you can't learn without them.

Lesson 4: Vision and strategic planning come later.
Premature visions and planning blind.

Lesson 5: Individualism and collectivism must have equal power.
There are no one-sided solutions to isolation and groupthink.

Lesson 6: Neither centralisation nor decentralisation works.
Both top-down and bottom-up strategies are necessary.

Lesson 7: Connection with the wider environment is critical for success.
The best organisations learn externally as well as internally.

Lesson 8: Every person is a change agent.
Change is too important to leave to the experts, personal mind set and mastery is the ultimate

protection.

Some other writers have suggested various types of change. For example, Daft categories change into four types: technological, product or service, administrative or managerial, and human resources and this is a useful typology for libraries. These types of change are of course not necessarily independent of each other and it is the innovation that triggers several different types of changes, which can be the most complex. For example, a new service such as online database searching may require a technology change as well as a change in organisation structure and in staff skills [15].

Change is above all a process and several writers have suggested some common elements or attributes in the process. For example, Fullan focuses on the following attributes [16]:

> *Need.* The extent to which the innovation addresses a priority need as perceived by those who are to implement the change. Some contend that the importance and perceived relevance of the innovation significantly impacts on the change process. Where the innovation focuses on a specific identified need there is likely to be a more enthusiastic and actively engaged change process.
>
> *Clarity.* The clarity of the innovation refers to the extent to which those implementing the innovation are clear about the essential features of the change and what they are to do differently. Often unspecified changes can cause great anxiety and frustration to those sincerely trying to implement them.
>
> *Complexity.* Complexity of innovation refers to the extent of change and the degree of effort required in implementing the change. For example an innovation that requires substantial rather than trivial change and perhaps one that involves new organisational arrangements, new mindset and new behaviours is complex.
>
> *Adaptability.* This is related to the degree of explicitness of the innovation. The less explicit the innovation, the more it is open to translation and modification during the implementation process and leaving innovation unspecified can result in confusion for those trying to effect the change.

Stages of change and the spread of change

Another important dimension of innovation and change is that it moves through various stages ranging from conceptualisation, through implementation, to a stage at which the innovation is accepted and maintained as part of normal way of operating? These stages of adoption, implementation and institutionalisation help to highlight that change is generally accepted a three-phase process [17].

If change moves through stages then how does change spread and get accepted as normal sector-wide professional practice. For example, how does a change in professional practice within one university library spread to become accepted as good professional practice across university libraries generally?

Concept such as Adoption and Diffusion help explain the spread of innovation into professional practice.

While, **Adoption** is the decision to put the new idea into practice, **Diffusion** is defined as the process through which an innovation is incorporated into a social system (such as the broad field of university or academic libraries). While the process of planned organisational change leads to the adoption of an innovation within a single organisation, the diffusion process occurs across the many organisations that are members of the same social system [18].

Communication is central to the diffusion process. The spread of new approaches and their acceptance into professional practice is dependent upon human interaction whereby one person communicates a new idea to others.

Time is also important to innovation and change. For example, the stages of change take place over time and the spread of innovation also takes time.

Change – the challenge of the future

Fullan has suggested that the real challenge of change for the 1990s is to deal with the more second-order change – changes that effect the culture and structure of organisations, restructuring roles and reorganising responsibilities. In the past we have often worked on the notion that if we just 'fix it' and if we all perform our roles better, we will have improved libraries [19].

The research-in-progress and these conference discussions are concerned with this deeper impact of innovation and change. Changing the culture and attitudes underpinning our professional practice is a much greater challenge than simply dealing with the electronic age and fixing electronic information. Over time we need to develop totally new and truly innovative approaches to our professional practice for the 21st century.

Conclusion

This paper has focussed generally on innovation and change in professional practice. It has presented a range of ideas and theories about innovation and change and speculated somewhat about how new approaches get introduced and become part of our professional practice. By focusing on the nature and characteristics of change and some theories to help unpack the complex nature of change, I hope the Conference themes have come more sharply into focus. I hope we are more excited about the prospect of planning for change in our professional practice. Eventually, I hope too that the research underway in Australia might also give greater clarity about how innovation and change takes place in our professional practice.

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MARKETING STRATEGIES:
LESSONS FOR LIBRARIES FROM COMMERCIAL BRAND MANAGEMENT

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MIT's Laboratory for Computer Science recently celebrated its 35th anniversary. As befits the home of such breakthrough technologies as time shared computing and the World Wide Web Consortium, the two-day event was both impressive and energizing. Computer celebrities were abundant, as were true stories of extraordinary progress in information technology, and soaring visions of a computer-enabled future.

Among the more memorable events for this librarian was an afternoon seminar on the future of computer user technologies. One of MIT's promising young faculty members chose to use his allotted time to describe his research in a field he calls Individualized Knowledge Access. Individualized Knowledge Access, to give an oversimplified description, involves the creation of a set of hardware and software tools designed to bring the information-rich world of the World Wide Web to the user in a highly customized, proactive manner. To illuminate the need for and importance of such research, he described the current search tools of the World Wide Web (WWW) in relationship to the existing strengths of the traditional research library; making the point that the best the web has to offer, at present, is simply a digital analog of the traditional research library. [Slide 1] For example:

- Both research libraries and the WWW offer vast amounts of easily accessible information;- but you have to find it before you can use it.
- Both research libraries and the WWW provide search tools that are designed to serve anonymous users in large numbers;- but you have to know how the tools work, and you must be sufficiently knowledgeable about the topic to be able to select from large retrieval sets those items that will be most useful.
- Both research libraries and the WWW have their own versions of "file not found";- for the Web it's "404", in libraries it's "not on shelf".

He went on to advise his computer science colleagues that the WWW has, thus far anyway, at best been able only to imitate the resources and services of an exemplary research library.

This true story illuminates the extraordinary importance of the brand identity possessed by academic research libraries. It should also serve as a wake-up call concerning our position in the marketplace of information. While academic research libraries have had the sense that we were chasing the emerging Web, it appears that, in fact, the Web is chasing us. We are, quite clearly, the market leader in the information business. We are the premium product, the high-road brand, the masters of market share, the standard against which all other information providers, including the WWW, compare themselves.

Any MBA student can tell you, however, that market share attracts competition. How, then, can libraries take advantage of our brand identity? More importantly, how can academic research libraries sustain this enviable brand position? Fortunately for us, the concept of brand equity is a well researched phenomenon in the business world, and there is a lot we can learn, as libraries, about retaining value and market share in the face of competition from information-industry upstarts and the WWW. This paper is but a brief overview of the academic discipline and established business practice known as brand management. It is hoped that the ideas presented here will spark your interest in the application of branding to libraries.

To understand the value of the brand equity of research libraries, we need to understand the basic concept of brands. The idea of branding is thousands of years old, and began when artisans and tradesmen started putting identifying marks on their products - both as a point of pride and as a sign of quality. Brick makers in ancient Egypt marked their bricks. Medieval trade guilds trademarked their products. The idea of assigning a memorable name to specific branded products arose as early as the 16th century, when high-quality whiskey distillers saw the need to protect consumers from being defrauded by lower quality product substitutions.

Over time, of course, the concept of brands has evolved into the marketing tool we know today. Yet the basic purposes of brand identity are still the same: **(1)** to make it easier for consumers to identify and remember a particular product, and **(2)** to strengthen the association of a product with one or more attributes of quality.

Today, branding strategies and purposes have become highly sophisticated - not to mention big business. The fundamental uses of branding remain, however, and in reviewing those uses we can see why academic research libraries have achieved such strong brand identities. At the heart of the matter is the fact that branding creates an important distinction among the products or services that may satisfy a customer's need. [Slide 2]

This central function of creating distinction among products - or, in the case of libraries, information services - provides significant benefits to the consumer.

- First, brands reduce the level of effort a consumer must put into assuring a specific, desired level of quality. A researcher or student must use his or her time and financial resources with care, and in choosing the library in which to conduct research, a "name brand" library is most likely to give a reasonable return on that investment.
- Second, brands reduce the perceived risk of making a costly mistake. Colleagues and advisors are less likely to criticize, and researchers are less likely to return empty handed from a research trip to a brand name library.
- Third, brands provide certain psychological rewards to the consumer such as prestige or status. Researchers can brag about spending a sabbatical at a prestigious, name-brand library. Compare this prestige and stature to the reaction of professional colleagues if a sabbatical were spent surfing the Web in search of scholarly materials.

But it is important to note that this function of distinction is a two-way street. Distinction has tangible benefits to the providers of products and services, such as libraries, as well as to consumers.

- First, brands facilitate repeat purchases, lowering advertising costs. Now most libraries don't actually advertise in the commercial sense, but they do promote their collections and services, and they invest considerable resources in the task of training patrons in the use of the collections. Repeat business is thus important to managing reference and patron support costs, as the new patron will consume far more staff resource than the experienced, frequent-visitor patron.
- Second, brand identity facilitates the introduction of new products if an existing product has a loyal following. For libraries, this can reduce the level of difficulty in introducing new services such as digital resources. If your patrons are happy with your print abstract and indexing selections, for example, they are quite likely to trust and use your online database choices and your information

literacy courses.

- Third, brands facilitate brand loyalty. If you saw a student through his undergraduate thesis, or if she mastered the mysteries of a research library in your facility, you will very likely have a loyal patron for life. Every experienced librarian knows full well that a newly arriving junior faculty member will have a built-in bias for the organization, services, and policies of the library where his/her PhD work was recently conducted.

Overall, the concept of brands has been exceptionally useful in the commercial world because brand identity enables the mutually beneficial establishment of a relationship between the person who has needs, and the supplier who has products and services. A predictable relationship is thus important for both consumers and producers. The concept is equally valuable in the academic world, for both researchers and libraries. Just as businesses benefit from a trusted relationship with their customers, libraries that achieve brand identity can benefit from the relationship between information provider and the information consumer.

Academic research libraries have been exceptionally fortunate in that for many years they have enjoyed a quasi-monopolistic status. This is particularly true for libraries that have deep historical roots. Even the wealthiest and most avid bibliophile could not hope to build a collection to rival that of an established academic library. Once a book or journal is out of print, a research library is typically the only place where a researcher can find and use the ideas and facts those documents possess. Historically, as academic libraries grew, defined, and refined their unique collections, universities began to see their libraries as a distinct competitive advantage. High quality libraries were an important factor in attracting high quality faculty and high quality students. Fine libraries not only enabled faculty to teach and conduct research at elite levels, they also enabled students to complete their studies at faster speeds and to higher standards.

Today, at the close of the 20th Century, we have a brave new world. The academic research library faces real and perceived competition as never before. Each new alternative to traditional scholarly communication is confidently proclaimed as the ultimate substitute for research libraries. The Los Alamos Preprint Server is touted as the low-cost, high-quality alternative to traditional physics literature - presumably extensible to all other disciplines. Commercial publishers and professional associations develop business plans and marketing strategies that will eliminate libraries and deliver books and articles directly to students and faculty - charging by the bit, of course. Meanwhile, university presidents, ever hopeful of lowering costs, wonder why the digital revolution isn't moving faster or saving more money.

How, then, should academic research libraries address the continuing need to garner support and funding? If we were commercial businesses, we would realize that one very important reason for our continued success is that we have brand equity. Thanks to our brand identity, and strong brand loyalty among our faculty and students, we can draw upon techniques from brand equity management to formulate a continued, effective response to these challenges.

Here follow some ideas that should encourage the librarian, and point to specific action items; because the study of brands in the commercial sector tells us that good brands have some remarkable characteristics in the marketplace.

[Slide 3]

First, strong brands have resiliency. They can take a hit from a new entrant in the market, or take a wrong turn under their own volition, and still bounce back. Remember how microforms were going to transform the future? - except for the fact that faculty generally despise the medium. Strong brands impart competitive advantage to the organizations that own them. Is there an academic institution anywhere that does not feature the library in its promotional literature and on its campus tours? They are the industry leaders that define the conditions that must be met to provide customer satisfaction.

Strong brands create loyalties. In the commercial world, this makes it difficult for alternatives to pull consumers away from the branded entity. In the academic world, it means that faculty and students brag about the excellence of the services and resources available from their library. Remember, brands lower consumer effort, reduce the risk of costly mistakes, and confer psychological rewards.

Second, strong brands enjoy these attributes not as a right, but because they understand the needs of customers, and have consistently delivered a product or service that the consumer expects. In the commercial world, this is accomplished by focusing on the three elements of successful brands: Quality, Consumer attitude, and Image. In the world of higher education and academic research the same rules apply.

Quality

[Slide 4]

Quality is absolutely essential to a strong brand. Few libraries neglect the importance of quality in their collection decisions, but libraries are often not as well equipped or experienced in service and support. Consumer research tells us that quality, in the abstract, is not sufficient to building a strong brand. Knowing that a library's collections are good is only one part of the library-user's quality perception. The patron must also feel positive about his or her experiences with the collections and, ideally, have gotten into the habit of having his/her information needs met by the library.

Attitude

[Slide 5]

Positive attitudes about the product are the second essential element of a strong brand. Attitude is, like quality, somewhat more complex than it would appear on the surface. The attitudes that are most useful to the library are those that are formed through personal behavior. A faculty member who has a direct, positive personal library experience will have a more enduring positive attitude than a faculty member who reads about library services in a newsletter. Consumer research tells us that repeated exposure is also extremely important. The student who uses the library successfully, multiple times, is significantly more positive in his or her support. Simple techniques can help build positive attitude by reinforcing "good thoughts" at the point of service. For example, positive attitude is often successfully reinforced in the commercial world by posting signs, banners, and slogans at key points of service.

Image

[Slide 6]

The third element of a strong brand is consistency of image. This does not mean a library should never change its image. Rather that libraries, like successful commercial brands, must not ignore the reality of their established image in the eyes of their patrons. Change should recognize that libraries, whether we like it or not, will have distinct identities in the minds of their loyal patrons. Sometimes consciously, sometimes inadvertently, we have all built brand images around our libraries, and we must be aware of our responsibility for that image. If you have cultivated an ambiance of quiet contemplation and scholarly research, for example, converting your main reading room into a bank of computer workstations over a weekend will almost certainly result in howls of protest. Remember that you have asked your patrons to participate in, and associate with, your image. As a result, you have a responsibility to your users' relationship with you. Those who neglect this reality can pay a heavy cost.

Brand management research tells us that organizations must have a strategy for bringing their customers along with them. A classic case in point can be found in two premier US public libraries; San Francisco and New York. Each of these fine libraries has been known for many years as a "university of the people", and their research collections are historically deep and rich. It should have come as no surprise, therefore, when each encountered a storm of adverse publicity as they attempted to discard large quantities of de-accessioned material. If an image of limitless resources, spanning the knowledge of the ages, is cultivated over generations of taxpayers, there should be little wonder that the public was enraged to find books piled in a dumpster. From a brand management perspective, this was as bad a move as the attempt to dump "Classic" Coca-Cola.

The average technical university library should have far less difficulty introducing change, provided the ongoing benefits to their patrons are adequately articulated and reasonably well timed. The key is to remember that your library users have formed a relationship with your brand image, and that you disrespect that relationship at your peril.

Instinctively, academic research libraries have been rather attentive to these important issues of quality, patron attitude, and consistency of image. We have been attentive to these issues, however, not because we were consciously building equity in our library brand names, but because they are service attributes to which we aspire. Nevertheless, through these efforts, we have built a form of equity, a reservoir of enduring value, that attaches to our libraries' names. In marketing terms, we have brand equity.

If we were for-profit corporations we would be far more conscious of the value of our brand equity than we are as nonprofit libraries. Brand equity is such a well established principle in the business world that it is routinely bought and sold among companies. The importance of brand equity to libraries is equally valid, but our intentions are far different. We want to be knowledgeable about brand equity so that we might use this knowledge to further the educational and research goals of our universities, and to sustain our leadership position in the world of educational information resources. By understanding how brand equity is built and managed, we can take advantage of this hard earned equity to sustain that which is of enduring importance to education, research, and society.

What are the specific advantages of brand equity for academic research libraries? [Slide 7] First, we can use the equity in our brand names to extend our products and services into new arenas. We have already learned that library patrons will follow us into the digital arena, for example, if they have come to trust our ability to meet their needs in the print environment. In marketing circles this is known as brand extension. Ideally, brand extensions will increase the overall use of a family of products and services, and, indeed, many libraries report increased in-library activity as a result of offering digital resources. On occasion, however, an original product may find that it has been cannibalized or diluted as a consequence of a product extension. For example, many large public academic libraries in the US report that undergraduates are increasingly unwilling to utilize traditional print products, preferring to use only resources that are available online - regardless of their relevance. These libraries have been obliged, as any good consumer product would, to devise strategies to interest undergraduate students in taking advantage of the full range of library resources.

The very real risks of dilution or cannibalization highlight the importance of having an explicit brand plan for managing our products and services into new arenas. Market research suggests that you should first make sure the extension is a good fit, and that it makes sense in relation to your existing products and services. Where an extension cannot be avoided (such as electronic resources), be prepared to think through the likely impact of the extension on your current operations. Second, you would be wise to consider whether the new product or service is superior to the alternatives available to your patrons. Suppose you want your library to offer contract research services to the business community in your city. Will your service be superior to the alternatives? What do you actually know about the alternatives? Third, make sure the new product category provides the level of benefits your target patron has come to expect from you. If you want to become a web portal, for example, are you prepared to invest the necessary resources in a quality site? A shabby or poorly maintained web site is quite likely to dilute the hard-earned brand equity of your traditional services.

Consumer research shows that a brand's ability to enter new arenas is in part a function of how dominant a brand is. So-called category leaders, those who set the standard for a product or industry, often must identify themselves with a super-ordinate concept in order to broaden their product reach. For example, when Disney entered the cruise ship market they didn't offer just another cruise ship experience. They positioned themselves to provide a full week of family-friendly entertainment at a predictable price. For libraries, the lesson here is clear. We must identify ourselves as super-ordinate providers of information resources and services, rather than as managers of books and journals. Managing books and journals is no less important than it have been in the past. It is, however, insufficient if a library is to maintain its brand equity in the face of competition from the WWW and other emerging information providers.

In the educational research environment where we have already been identified as the brand to beat, each of us had best have a strategy to manage our brand equity. [Slide 8] As we face the task before us, it is helpful to remember that brand equity is built and managed in successive stages. Depending on the age and stature of your library you may be at any one of the three distinctive stages of brand equity growth. In the first stage you will develop, if you haven't already, a quality product that has a positive image and strong name recognition. Think of this stage as building a platform. Try not to be too narrowly focused in concept, however. While you will, of course, deliver specific products and services, remember to consider your responsibilities broadly. For example, in your serials selection choices you are facilitating scholarly communication, not just buying journals.

At the second stage your goal is to explicitly manage the relationship between your brand and your patrons. Frequent exposure to your products and services is essential. Establish multiple metrics for tracking and computing your value to the organization. Insure that there is positive reinforcement about your contributions to education and research at your university. These and other useful aspects of relationship management are important at this stage.

The third and final stage is to successfully manage the brand equity in your core services into related but appropriate products and services. Those extensions will be specific to your own situation, but might include such activities as an expanded role in traditional scholarly publishing, managing your institution's educational technology, delivering data research services, offering courses in information management or information technology literacy, providing web site design and management services, or offering contract research and/or digital publishing services. Developing a reputation for appropriate extensions of your library's brand will thus position your library for other new opportunities as they are presented by the changing world of information resources, education, and research.

So, maybe it's not so bad to have the World Wide Web chasing us. After all, imitation is the sincerest form of flattery.

Slide 1

The World Wide Web can be viewed as an analog of the traditional research library.

- Vast amounts of information; but hard to use.
- Search tools serve many users; but user training is required
- Large sets are retrieved; but expertise is needed to filter.
- Items wanted by not be available; dead-end links and "not on shelf".

Slide 2

Branding provides benefits to both consumers and providers.

Consumers	Providers
• Lowers level of effort to achieve results	• Lowers costs of promotion
• Reduces risk and cost of error	• Facilitates the introduction of new products
• Psychological rewards include prestige and status	• Facilitates repeat customers

Slide 3

Academic research libraries' distinct brand identities confer value.

- Resiliency in times of change
- Competitive advantage to parent institutions and patrons alike
- "Consumer" loyalty

Slide 4

Strong brands exhibit consistently high quality.

- Products
- Services
- "Habit forming"
- Positive feelings

Slide 5

Strong brands reinforce specific kinds of positive attitude.

- Behavior based
- Repeat exposure
- Reinforcement at points of service

Slide 6

Strong brands exhibit a consistent image (personality).

- Change must:
  - be mindful of core identity
  - maintain valued distinctions
  - reinforce relationships

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Slide 7

Brand equity, like other forms of equity, will erode if not managed.

- Adopt a super-ordinate concept
- Extend products and services into new arenas
    - fit
    - quality
    - benefits

Slide 8

Brand equity is built in successive stages.

- Develop a quality-oriented operation with a positive image and strong name recognition.
- Manage the relationship between your "brand" and your patrons.
- Extend your brand identity into related but appropriate products and services.

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